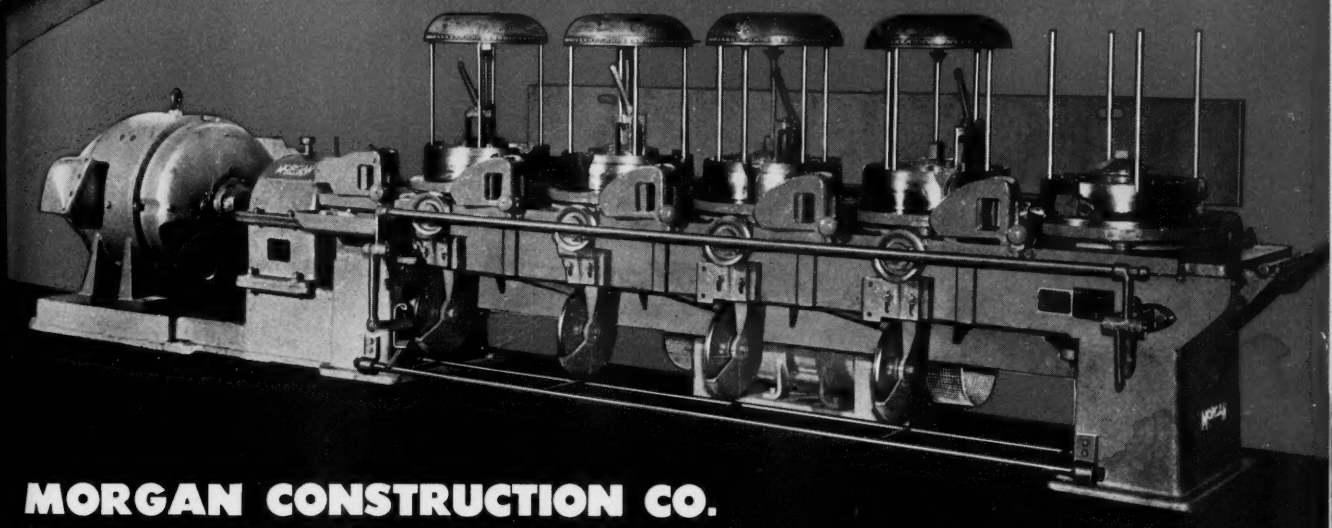
WIRE AND WIRE PRODUCTS

DECEMBER, 1950

To Cost Conscious Mill Operators:

Investigate MORGAN-CONNOR WIRE MACHINES

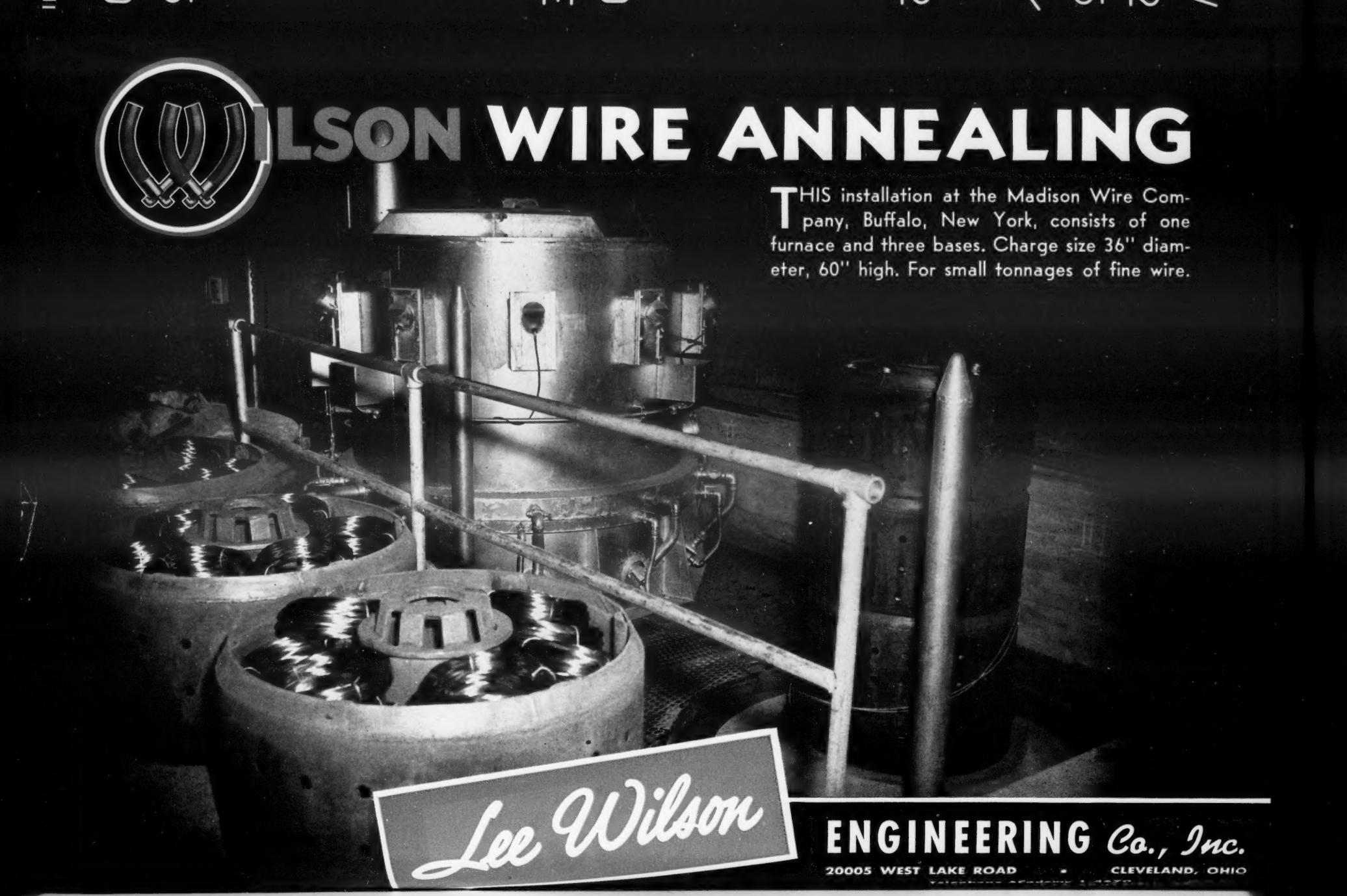


MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

WILSON WIRE ANNEALING

THIS installation at the Madison Wire Company, Buffalo, New York, consists of one furnace and three bases. Charge size 36" diameter, 60" high. For small tonnages of fine wire.



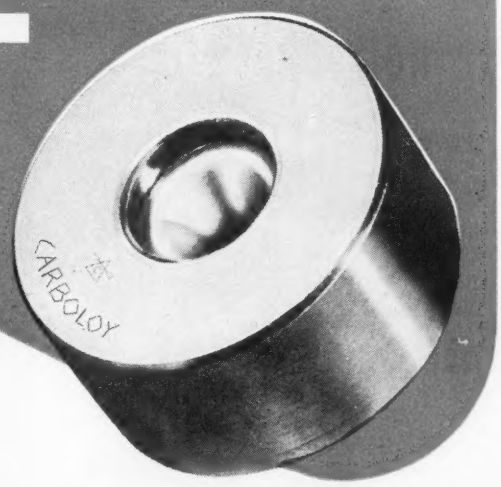
Lee Wilson

ENGINEERING Co., Inc.

20005 WEST LAKE ROAD • CLEVELAND, OHIO

DEC

LIFE STORY OF A DIE



Several months ago, a well known wire mill in the Mid-West* decided to see what Metalcoat #267 could do for them. They had been using lime.

A very fair comparison test was made on die life, using their regular Carboloy dies, between lime-coated and Metalcoat #267-coated wire. The following figures are those taken from the work sheets of four wire drawers on the first day of their test:

No. 1—Starting from .080 patented size, five drafts, down to .032—tonnage drawn with same dies, 5600 pounds.

No. 2—Starting with .080 patented size, five drafts, 8400 pounds with each of four dies, 5600 pounds with finishing die.

No. 3—Starting with .059 patented size, six drafts, down to .0185, drawn with same dies, 1350 pounds.

No. 4—Starting with .080 patented size, six drafts, first die, 6800 pounds, second, third, fourth and fifth, 9450 pounds each, sixth die, 4600 pounds. Finishing die was changed and 6800 pounds drawn.

Wire was all 76 carbon.

Need we say more? There just isn't ANY wire coating which will give the die life that Metalcoat #267 will give, at high speeds.

*Name available on request.

A Magnus Specialized Product

Metal Coating Division

MAGNUS CHEMICAL CO., INC.

Garwood New Jersey

IN CANADA—MAGNUS CHEMICALS, LTD., MONTREAL 36, QUE.

For Comfort...

Steel

Nothing else can provide the same lasting comfort—in sitting, riding or sleeping—as well-designed upholstery springs. Especially springs made from Silver Star Spring Wire.

Spring makers and users know from experience they can rely on this special-purpose, high-carbon wire to meet a wide range of upholstery requirements. It coils and knots readily, is always uniform in its properties, makes lively springs that stay resilient through years of hard service.

We have put a lifetime of wire-making experience into this spring wire. We give it special care and processing in our modern wire mills so that it's tailored just right for coiled upholstery springs. And that's reason enough why so many manufacturers keep on using Silver Star, year after year.

BETHLEHEM STEEL

Silver Star SPRING WIRE BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

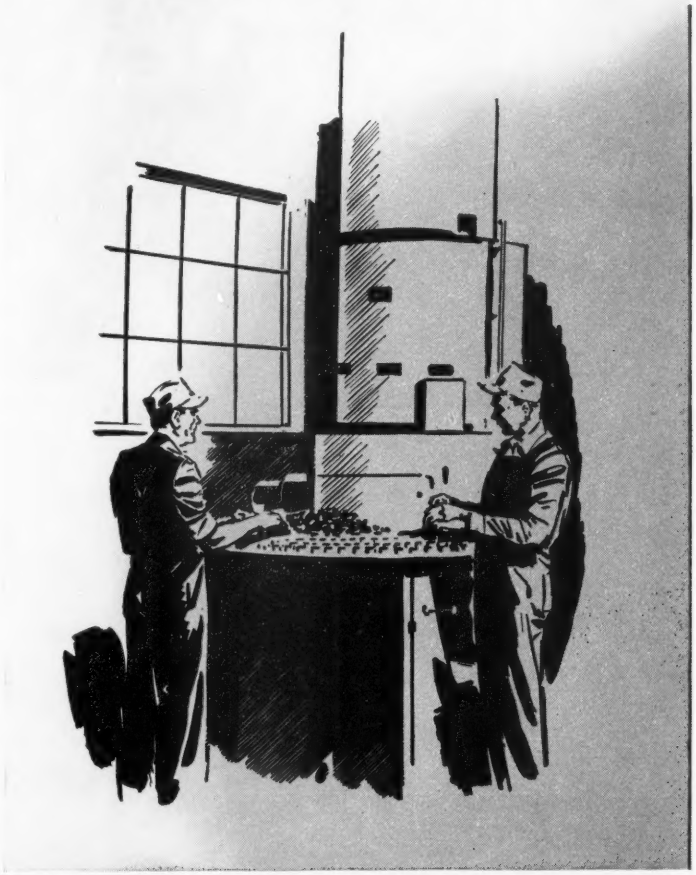
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

WIRE & WIRE PRODUCTS, Vol. 25, No. 12, December, 1950, Publication Office at One Sherman Ave., Jersey City, N. J. Executive Office 300 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec'y. and Treas. Subscription price: U. S. $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, January 10, 1949, at the Post Office, Jersey City, N. J., under Act of March 3, 1879.

Today it's Roebling!

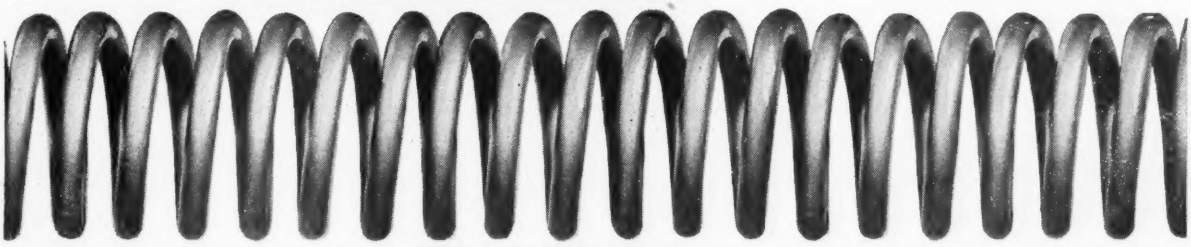
for Oil-Tempered Spring Wire... and production records tell why!



A MANUFACTURER'S own tests are absolutely necessary. But how his product performs in plants all over the country is the real proof of the pudding! And it's a matter of record that Roebling Oil-Tempered Spring Wire brings users fewer machine stoppages, and cuts down rejects.

Roebling has one of the largest specialty wire mills in America. From steel-making to finished wire, Roebling techniques and the most modern precision machines ever built assure a product that is always uniform in mechanical and metallurgical properties . . . that saves you preparation time and brings faster, smoother operation!

Have your Roebling Field Man help you choose the Oil-Tempered Spring Wire—or other round, flat or shaped wire—that will be best for your product and your production. John A. Roebling's Sons Company, Trenton 2, New Jersey.

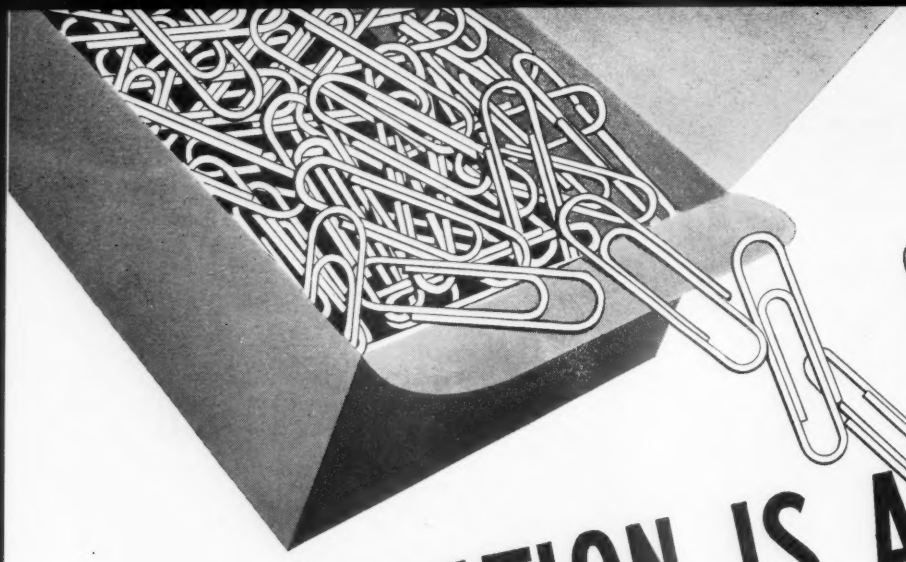


Roebling makes a wide range of Round and Shaped Wires in various grades of steel. Some are also available in other metals, including copper and copper alloys.

ROEBLING

A CENTURY OF CONFIDENCE

Atlanta, 934 Avon Ave. ★ ***Boston,*** 51 Sleeper St. ★ ***Chicago,*** 5525 W. Roosevelt Road ★ ***Cincinnati,*** 3253 Fredonia Ave. ★ ***Cleveland,*** 701 St. Clair Ave., N. E. ★ ***Denver,*** 4801 Jackson St. ★ ***Houston,*** 6216 Navigation Blvd. ★ ***Los Angeles,*** 216 S. Alameda St. ★ ***New York,*** 19 Rector St. ★ ***Philadelphia,*** 12 S. Twelfth St. ★ ***Portland,*** 1032 N. W. 14th Ave. ★ ***San Francisco,*** 1740 Seventeenth St. ★ ***Seattle,*** 900 First Avenue S.



A REPUTATION IS ATTACHED TO BILLIONS OF THESE

● Little things in life are frequently very important. One of our customers is partial to Continental KoKote steel wire. Because of its unusually bright, chrome-like lustre and desirable degree of stiffness, he uses light gage KoKote to make billions of paper clips. These wire clips are small to be sure, but this customer's reputation—and ours—are attached to them. We feel, therefore, the greatest responsibility toward our customer and his wire-fabricating problems.

There is this kind of "family" relationship between Continental and the many manufacturers we supply with lustrous KoKote . . . whether they use our wire for paper clips, spiral binding or broom wire. We act in the belief that business success ultimately depends on SERVICE . . . so you'll always find us ready and willing to help you. If you are troubled by a particular wire-fabrication problem, please feel free to write us at Kokomo, Indiana. There's no obligation.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

100 YEARS OF SERVICE

In Recognition
Of the Founders, Managers and Employees of this Company who have so fully contributed to the Economic and Social growth of their Community, the State of Connecticut and the United States of America for more than
One Hundred Years
THE MANUFACTURERS ASSOCIATION OF CONNECTICUT, INC.
Awards this CERTIFICATE of APPRECIATION to
The Hartley Tool & Die Co.
Established in Connecticut 1850
In Witness Whereof these presents have been signed, sealed and delivered by The Manufacturers Association of Connecticut, Inc., This twelfth day of September, A.D. One Thousand Nine Hundred and Fifty
PRESIDENT

With five generations of Hartleys ever striving to serve you better and more efficiently.

It is small wonder, then, that Hartley's Tungsten Carbide Dies have attained a degree of excellence that spells savings for you in your wire drawing operations.

The Hartley Tool & Die Company is proud to reproduce the certificate recently awarded to it by the Manufacturers Association of Connecticut for their long period of successful service to its community, the state and to industry.

Long-experience and ingenuity in the manufacture of wire drawing dies and other standard carbide products has made Hartley Dies both lower in first cost and more economical in wire, tube, heading and other production costs.

You need not guess as to the quality of your dies if they bear the HARTLEY trade-mark.

Special and shaped dies engineered to meet your needs.

Send for catalog and price list on standard carbide dies.

WATCH FOR THE HEART ON *Every* DIE

your assurance of highest quality and service

L E Y

TRADE MARK REGISTERED

HARTLEY
TOOL & DIE COMPANY
THOMASTON, CONNECTICUT
Telephone 625 - 626

New Low-Twist **Vitron**

300 GLASS YARN

cuts cost of magnet wire serving

VITRON 300 Glass Yarn has been developed to the exact specifications of magnet wire manufacturers who asked for a low-twist glass yarn of medium filament size. Here's the result:

Direct cost savings of more than 20% over previously used 900 and 450 yarns.

Improved edgewise bend resistance and smooth finish with less build-up.

This product improvement and cost saving can easily be applied to your magnet wire production. Write for information and engineering consultation.

Here are the Performance Properties of VITRON

- high strength
- withstands 1000° F.
- dimensionally stable
- excellent electrical properties in minimum space
- absorbs no moisture
- resistant to rot, mildew, oils and most acids
- easily impregnated or coated

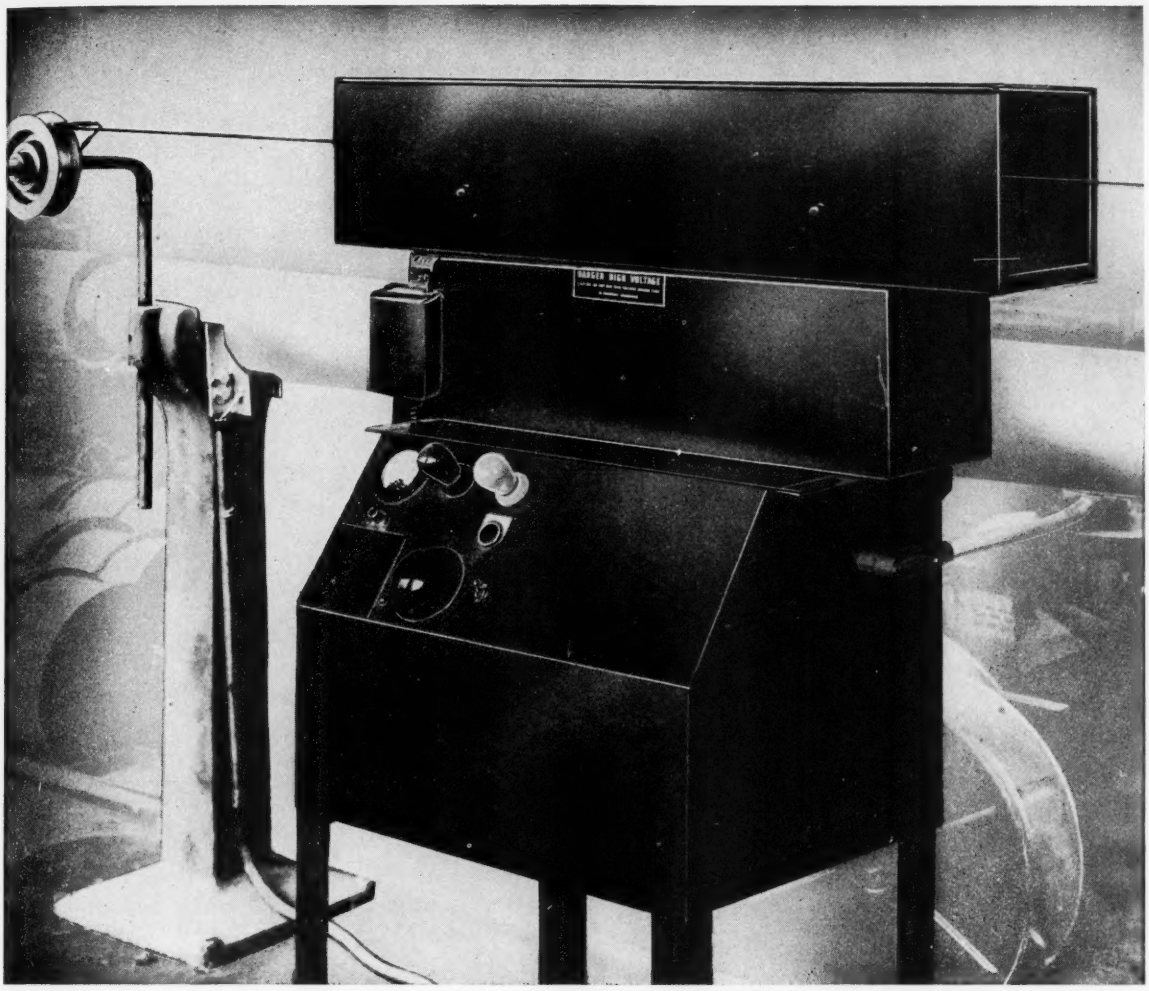
Will these qualities improve your product? If so, we'd like to help you profit from them.

Vitron®
GLASS FIBER

ELECTRICAL INSULATING MATERIALS

GLASS FIBERS INC. · WATERVILLE, OHIO

PHONE: WATERVILLE 2201



DAVIS SPARK TESTER INSTALLATION
FOR CONTINUOUS CURE AND PLASTIC EXTRUDER

The spark tester is equipped with a transformer which has a range of voltage from 3,000 to 16,000.

When a fault occurs the horn blows and the fault is registered on the resetable counter.

The fault relay will operate in less than 1/180th of a second and assures accurate location of the fault.

The operation of the Davis Spark Tester is not affected by wet wire.

Meets Underwriter's Laboratories' specifications for spark testing!

Write us today for detailed information!

DAVIS EQUIPMENT

THE R. L. DAVIS ELECTRIC CO., INC. • WALLINGFORD, CONN.

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

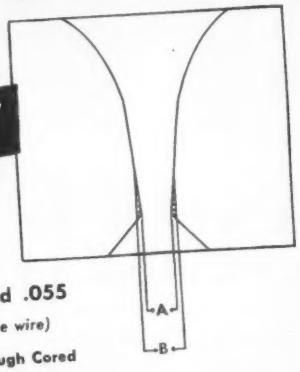
You Can Depend on Firthaloy for Improving Operating Economies

Faster Finishing Time
... with minimum work

2 Finishing Steps Eliminated
... on sizes R-3, 4 & 5

2 Easy Steps with Firthaloy

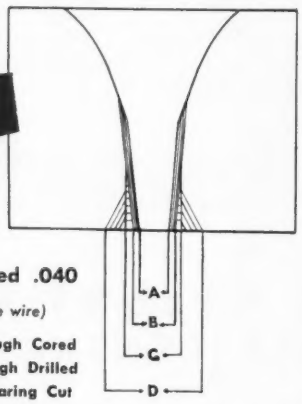
NEW



Rough Cored .055
(for 16 gauge wire)
A = .055 Rough Cored
B = .0625 Finished

Twice as Many Steps in Finishing Old Style Dies

OLD



Rough Cored .040
(for 16 gauge wire)
A = .040 Rough Cored
B = .055 Rough Drilled
C = .0625 Bearing Cut
D = Back Relief

FIRTHALOY
SUPER-STANDARD FEATURES:

1. New, Higher nibs
2. Preformed back relief
3. Cored holes — all standard sizes
4. Carbide Locked in steel
5. Positive back-support for nibs
6. Advanced nib contour design
7. Precision manufacture
8. Complete assortment of Firthaloy grades
9. Firthaloy die engineering service
10. Immediate shipment from stocks

The new standards are typical of Firth Sterling's everlasting efforts to improve operating economies in wire mills. You can depend on Firth Sterling to help you produce Better, Faster and Cheaper.

Firth Sterling
STEEL & CARBIDE CORPORATION
McKEESPORT, PA.

OFFICES in Hartford, New York, Philadelphia, Pittsburgh, Cleveland, Dayton, Detroit, Chicago, Los Angeles, Birmingham.

In Canada:
Chapat Engineering Co., Ltd.
Hamilton, Ontario

R-196

IN THE WORLD OF Wire Drawing

The foremost name in wire drawing compounds throughout the century, "STEELSKIN" has constantly—painstakingly—EXPERTLY—led the way in pioneering new and improved formulas for the industry.

Now—as the result of years of usage in the largest mills throughout the country — "STEELSKIN" is able to furnish you with performance data—ACTUAL PERFORMANCE RECORDS, not theoretical possibilities—that explain why A GREATER TONNAGE OF STEEL WIRE IS DRAWN THROUGH "STEELSKIN" compounds, than any other product. Our research engineers—graduate chemists, doctors of chemistry—industrial experts, are ready to show you how your plant can duplicate some of the amazing records amassed by others using "STEELSKIN" products.

SOME EXAMPLES

* Large Eastern Mill: Producing as high as 34,000 tons of low and high carbon wire per month—with only 2 die men per shift—using "STEELSKIN" CXH—containing EXCLUSIVE—R. H. MILLER COMPANY ADDITIVES.

* Mid-Western Mill: Starts with No. 5 rod and finishes in continuous holes of drawing to 20 gauge wire at 3,300 F P M — using CXH, containing EXCLUSIVE — R. H. MILLER COMPANY—ADDITIVES.

* Pennsylvania Mill: For many satisfactory finishes including highly acceptable Spring Wire finish and Nail Wire finish, using CXH, containing EXCLUSIVE — R. H. MILLER COMPANY—ADDITIVES.

This drawing lubricant—CXH Powder is only ONE of a comprehensive line designed for use with—factually—EVERY metal, and to meet EVERY drawing condition in the industry. You are cordially invited to avail yourself of our research staff to determine the PRECISE—the SPECIFIC—the TAILOR-MADE compound of your drawing operation.

Write—phone—or wire, and R. H. MILLER COMPANY research engineers will be at your disposal.

Steelskin BRAND
REG U.S. TRADE MARK

R. H. MILLER COMPANY, INC.
HOMER, N. Y.

Wire · Tubing · Stamping · Deep Drawing Soaps and Compounds

Keep Spring Grinding Costs DOWN

with Cost-Cutting NORTON *Discs*

Norton Vitrified Discs Offer:

Faster Cut—
more usable springs per hour

Cooler Cut—
a minimum of burrs, burning and distortion with resultant better quality

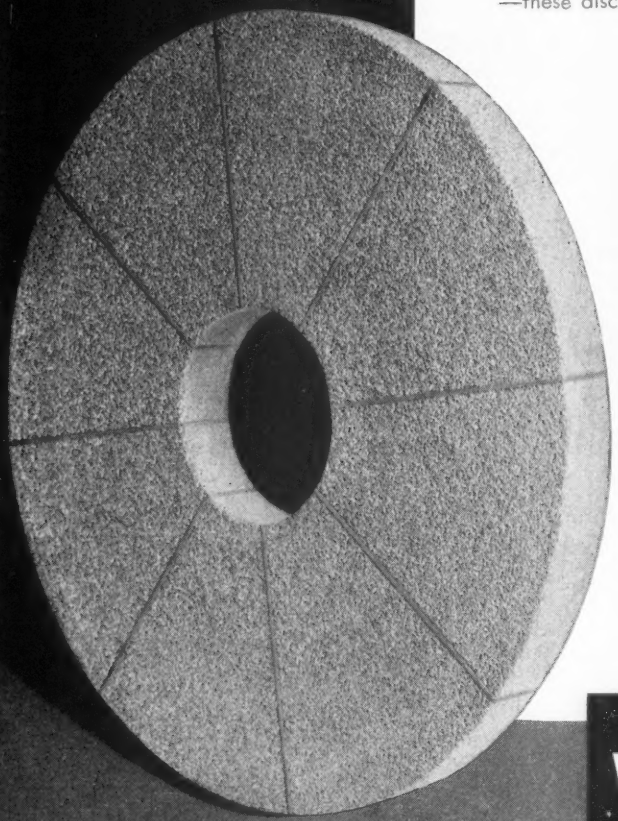
Longer Life—
the faster cutting action and more durable bond of Norton vitrified discs means less dressing is necessary —these discs last longer

Uniform Grinding Action—
the same fast, cool cutting action from each disc throughout its entire life — discs not affected by coolant, aging or storage conditions

PLUS Lower Initial Cost—
vitrified discs cost substantially less than resinoid discs

Because They Contain:

The Right Abrasive—
fast, cool cutting 32 ALUNDUM, or sharp, tough 57 ALUNDUM abrasive; **the Right Bond** — vitrified; **the Right Grain Size; the Right Grade; the Right Structure**— open or "P" type; **the Right Type of Mounting.**



Take Advantage of Norton Service: Let a Norton abrasive engineer study your spring grinding jobs. He'll take into consideration the type of grinder used, the method of operation, the material ground, the size and shape of the work, and the finish desired. Then he'll recommend a disc of exactly the right combination.

NORTON COMPANY • WORCESTER 6, MASS.
Distributors In All Principal Cities

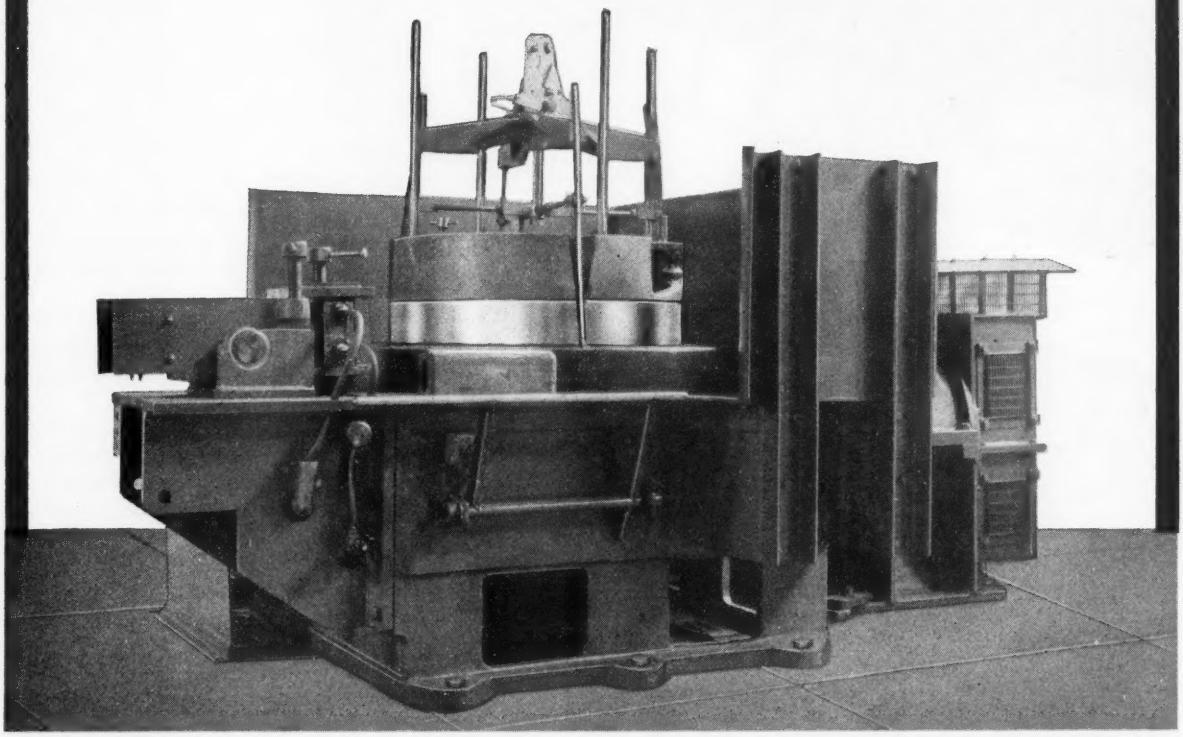
W-1307

NORTON
ABRASIVES

NOW—TREMENDOUS SAVINGS

in maintenance costs!

Marshall Richards V20 Bull Block
has replaceable hardened steel inserts



HERE'S A DEVELOPMENT of prime importance today . . . hardened steel *replaceable* inserts at the points where greatest wear occurs in the block . . . maintenance costs slashed to a fraction of what they used to be!

The Marshall Richards V20 is a heavy vertical Bull Block designed to draw mild steel from inlets up to approximately 1 1/16". Blocks ranging in size between 28 and 36 inches, and motors up to 100 H.P., can be accommodated. Drawing speeds are readily variable to any desired rate between 100 and 300 feet per minute.

Full information about the V20 or the complete line of Marshall Richards wire drawing equipment will be sent you promptly upon request.

MARSHALL RICHARDS MACHINE COMPANY, INC.

1100 BROAD STREET, TRENTON 10, NEW JERSEY
Telephone, Trenton 9478 Telegrams, Marich-Trenton

MARSHALL RICHARDS

D R A W O N O U R E X P E R I E N C E

Talide Work Rolls

7 Reasons why mills use Talide Rolls

1. MORE PRODUCTION
2. BETTER FINISH
3. HIGHER SPEEDS
4. LESS DOWN TIME
5. CLOSER TOLERANCE
6. GREATER REDUCTION
7. FEWER REJECTS

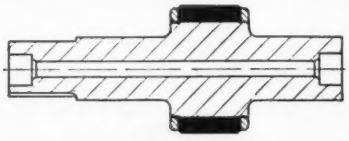
Solid Carbide Rolls
(weighing up to 1000 pounds)
for Strip or Sheet

● Profitable, increased tonnage with Talide Carbide Rolls can be had Mills regularly report astounding new figures. What's more, increased operating speeds and improved surface finish make subsequent polishing and buffing unnecessary.

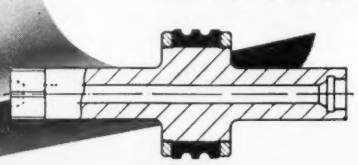
Talide Tungsten Carbide Rolls are used for ordinary finish or mirror-finish on such items as cold rolled stainless, spring steel, razor steel, alloys, carbon, aluminum foil, tinsel ribbon and flat wire.

Metal Carbides Corporation originally developed the art of making Carbide Rolls, and only this firm makes solid or sleeved Talide Carbide Rolls weighing up to 1000 pounds. Available in diameters up to 10" and lengths up to 40". We make the smallest and largest rolls in the world!

Write us today. We'll show you how to get *more production, better finish, higher speeds, less down time, closer tolerances, greater reductions* and *fewer rejects* on your mill operations



Sleeved Rolls for Flat Wire



For Shape Wire

SINTERED CARBIDES
METAL CARBIDES CORPORATION
TALIDE
YOUNGSTOWN, OHIO
HOT PRESSED CARBIDES

METAL CARBIDES CORPORATION

YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS · DRAWING DIES · WEAR RESISTANT PARTS

Standard's NEW No. 21 WAX

A New Wax Coating for Galvanized or Tinned Wire

PROTECTS BRIGHT FINISHES, LUBRICATES, PREVENTS RUST

No. 21 Wax provides several valuable features at low cost that help sell wire and that facilitate certain manufacturing operations:

1. It will preserve bright color and finish on galvanized and tinned wire for several months.
2. Used on regular galvanized wire in barb wire or fencing machines, it provides sufficient lubrication for the forming work.
3. Is water dispersible and can be used in water quench box or in separate tank following quench box. Best results in latter at about 180° F.
4. Imparts rust preventive quality. Used ¼ of 1% solution with lime substitute coatings.
5. It also shows excellent results as a drawing lubricant in copper, liquor finished or galvanized wire drawing.

Standard compounds are made for every specialized wire drawing or cold forming requirement. Standardize with "Standard" — and be sure of good results.

Our new coating compound for rod bolt and rivet stock is an example. "Ebony" compound for copper and aluminum drawing is another. Try them!

Call or Write Headquarters or Any Standard Service Center:

INDUSTRIAL COMPOUNDS CO.
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1010 San Fernando Rd.
Los Angeles, California

INDUSTRIAL COMPOUNDS CO.
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240 Battery St.
San Francisco, California

STANDARD INDUSTRIAL COMPOUNDS CO.
William Kinnery
Millbury, Massachusetts

STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with any STANDARD representative for courteous, competent service.

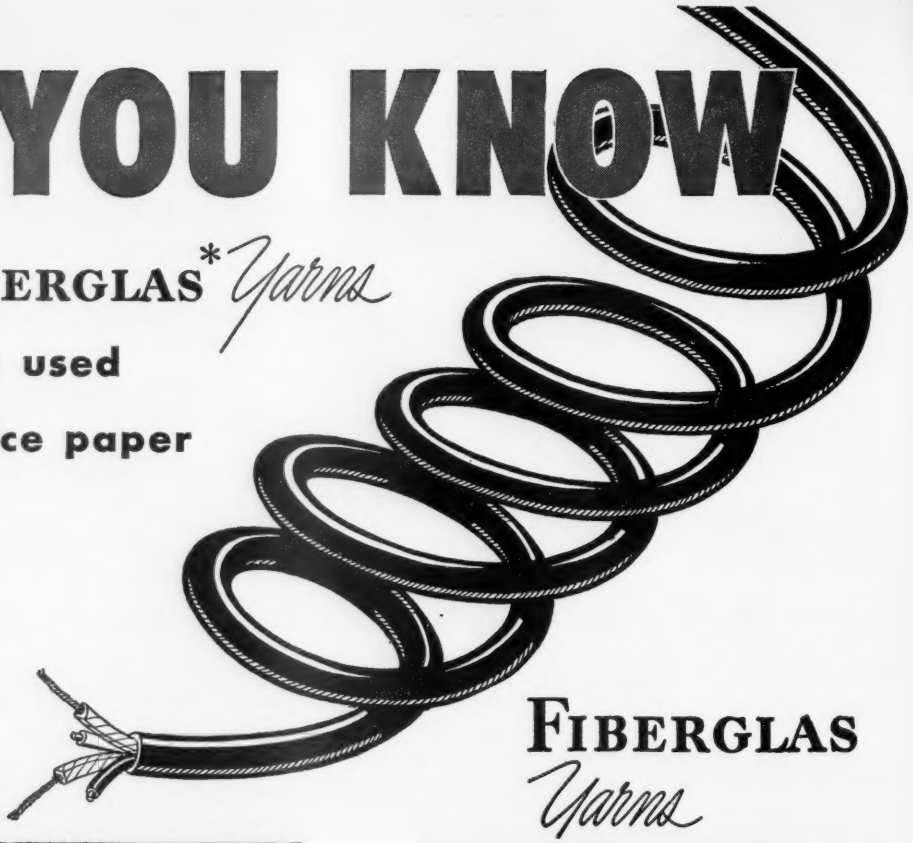
wire drawing lubricants

Standard INDUSTRIAL COMPOUNDS CO., INC.

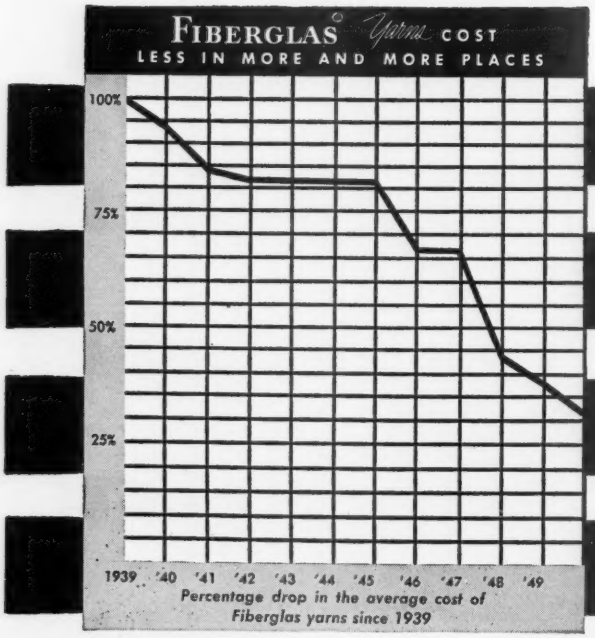
4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

DO YOU KNOW

why FIBERGLAS* *Yarns* are being used to reinforce paper filler in FLEXIBLE CORDS?



FIBERGLAS *Yarns*
REINFORCED PAPERS


FIBERGLAS® Yarns COST
LESS IN MORE AND MORE PLACES
100%
75%
50%
25%
1939 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49
Percentage drop in the average cost of Fiberglas yarns since 1939

- HAVE GREAT TENSILE STRENGTH
- HAVE GOOD CONFORMANCE
- ARE EXTREMELY FLEXIBLE
- AND ARE LOW IN COST!

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

For complete information about Fiberglas for this and other uses, write Owens-Corning Fiberglas Corporation, Electrical Sales Division, 16 East 56th Street, New York 22, N. Y.

OWENS-CORNING FIBERGLAS *Yarns*

FIBERGLAS IS IN YOUR LIFE...FOR GOOD!

SYNCRO PRECISION BUILT EQUIPMENT

is your best answer to high speed fine wire SPOOLING...

because OF THESE ADVANTAGES:

- Indexing Arm automatically reduces arbor speed during the winding of a spool permitting constant wire speed.
- Light, momentary contact of the Indexing Arm assures clean, unmarked wire.
- Adjustment is provided for presetting or regulating wire tension while in operation. This guarantees a uniformly wound package.
- Distributor can be adjusted while in motion to suit the width of spool and to obtain correct relation to spool flange.
- "Full reel" and "broken wire" automatic shutdown switches.
- Accessibility to operator—allowing maximum efficiency during reloading period.
- Simple resetting mechanism.
- Expanding arbor for vibration-free operation.

Syncro Patented Fine Wire Spoolers can be furnished with expanding type spool arbors as shown or with outboard bearing supports for small bore spools.

SYNCRO MACHINE COMPANY PERTH AMBOY • NEW JERSEY • USA

CARBOLOY flat wire rolls outlast steel 48–1

—large eastern mill reports

Setup time reduced 6 to 1; more uniform wire produced with superior finish

Think of it!—In a large eastern rolling mill, 6" flat wire rolls of Carboloy cemented carbide have been in use over one year, 24 hours per day, 5 days per week—and it has not been necessary to regrind them to date.

Here are more benefits

You'll find these other production figures interesting, too. Look at this:

- **Spot changes,** twice a week with steel, now only every six months—outlasting steel at a ratio of 48 to 1.
- **Setup time** cut from two hours every month with steel rolls to two hours every six months with Carboloy.

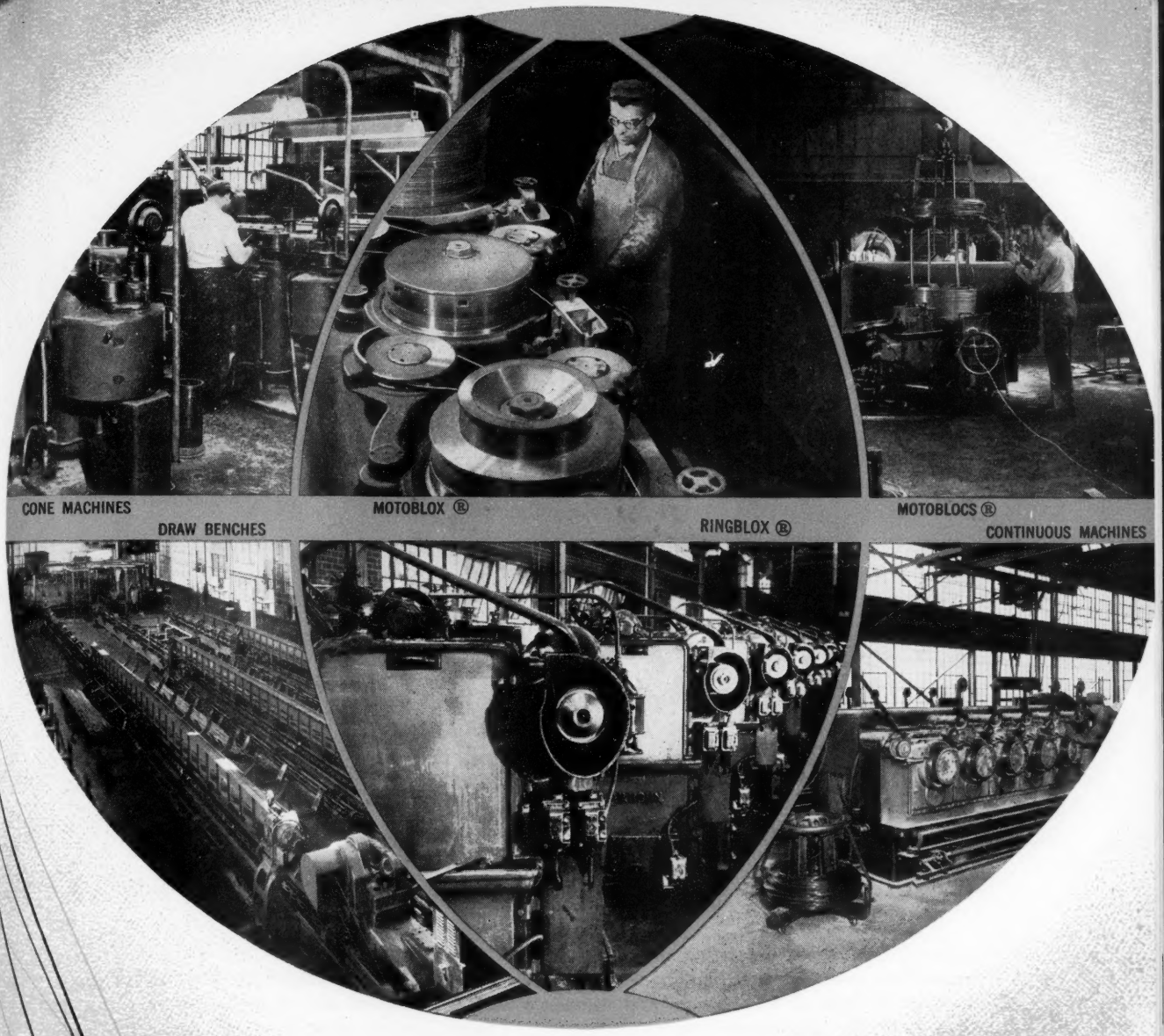
Carboloy has brought increased production, longer roll life and lowered manufacturing costs to this eastern mill. Rolling high and low carbon steel wire for bobby pins, stitch and spring wire and similar products, they *know* Carboloy rolls are good.

Why not find out for yourself how much good, savings-wise, Carboloy flat wire rolls can do in your mill. Write today for further information. Carboloy Company, Inc., 11171 E. 8 Mile Street, Detroit 32, Michigan.

With Carboloy, you'll get all these advantages in your flat roll operations:

- **Less down time for spot changes and setup**
- **Longer roll life**
- **Better product finish**
- **Less regrinding down time**
- **Increased production**

CARBOLOY®
CEMENTED CARBIDE



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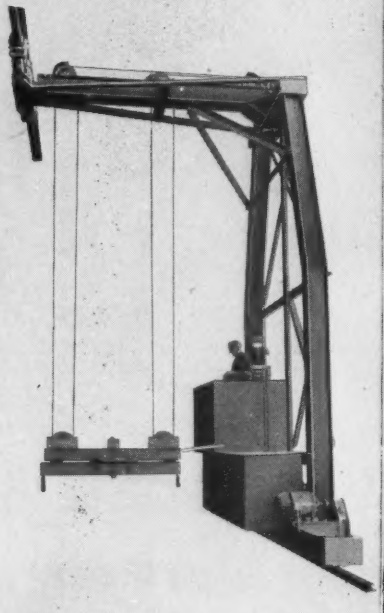

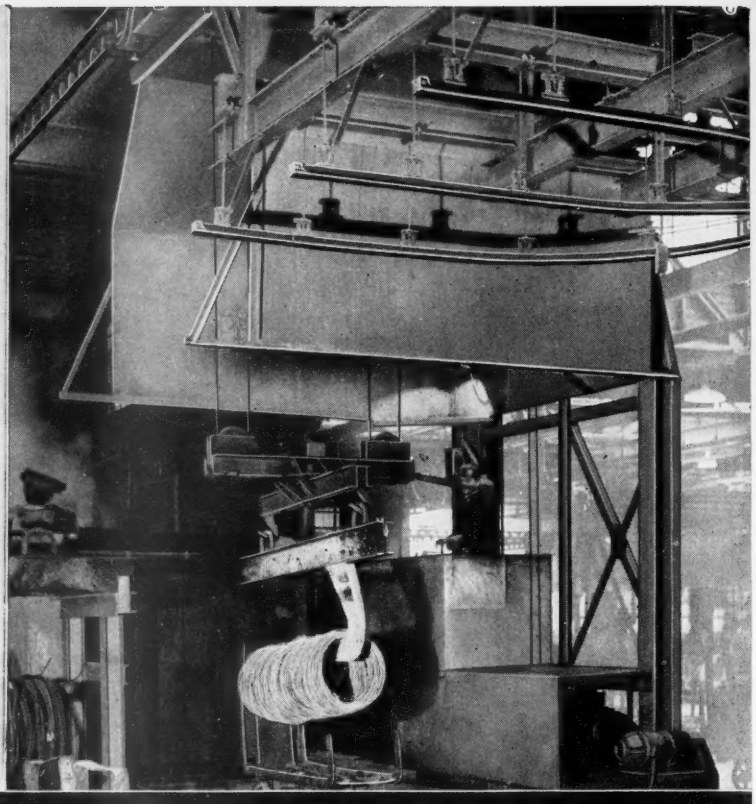

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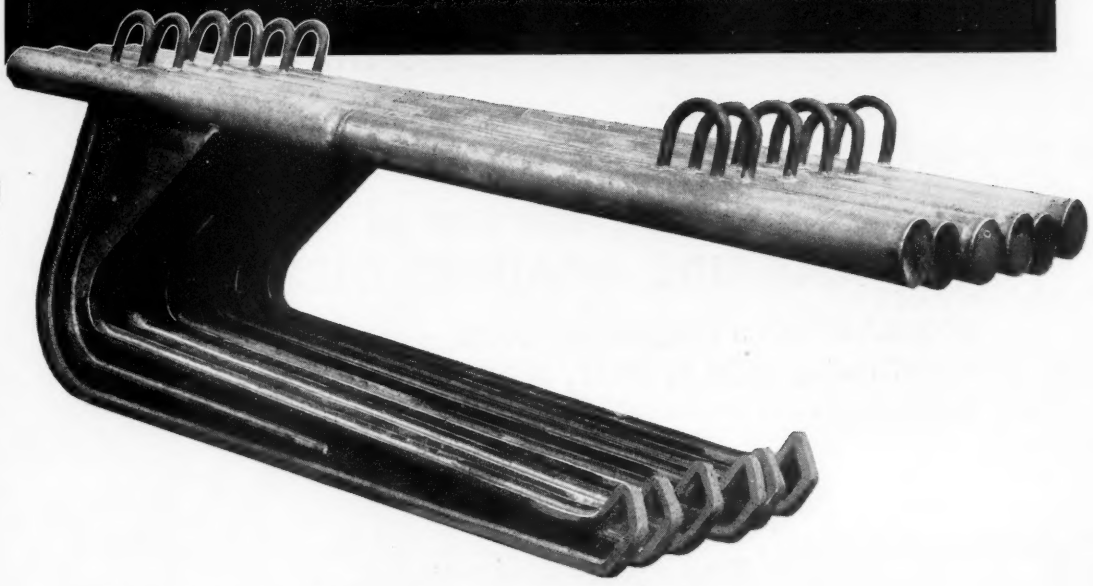

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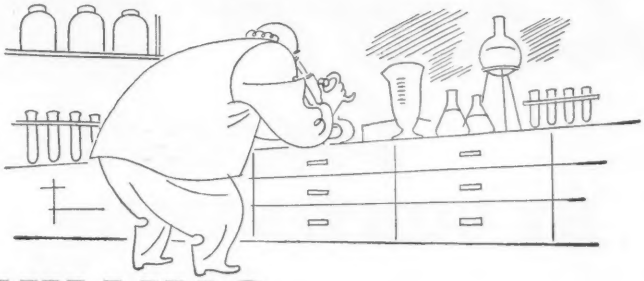

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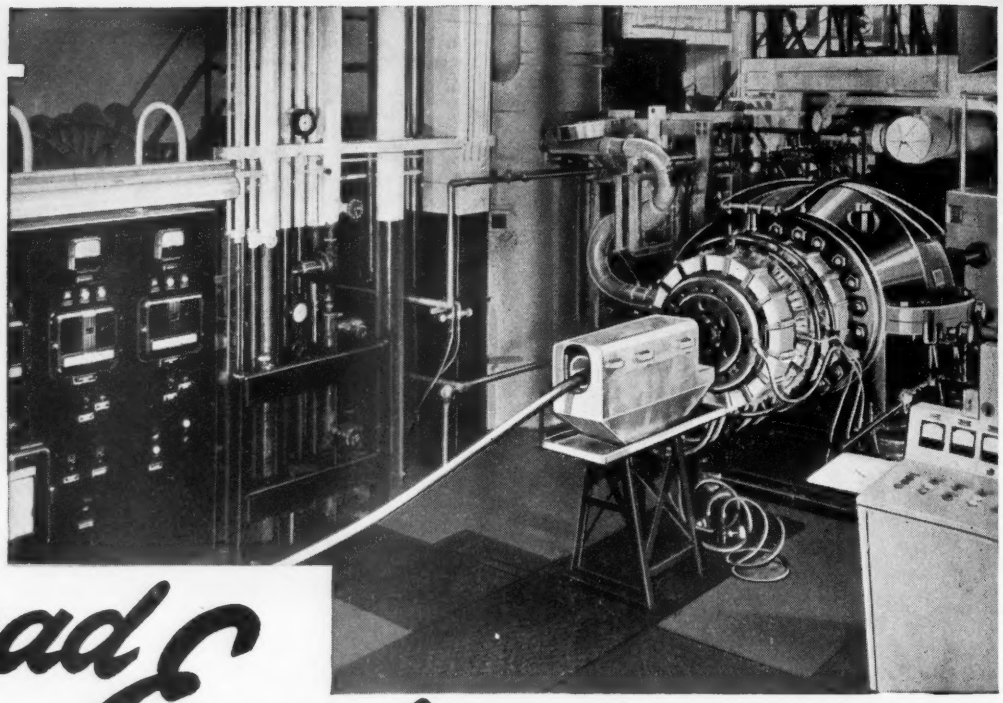

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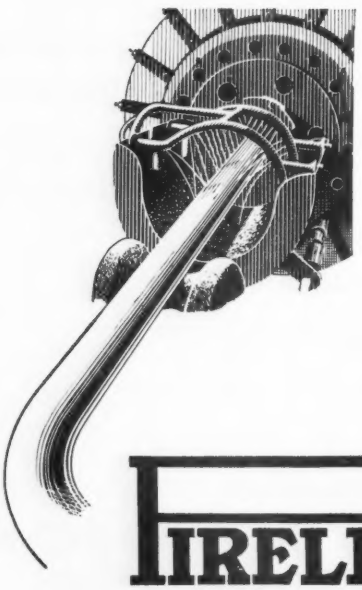

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FROM DATE OF INCORPORATION ON NOVEMBER 23, 1900 TO DECEMBER 31, 1949

THE COMPANY RECEIVED:			
From customers for products purchased by them		$5,122,702,261	
Dividends received, interest earned, and other income		76,068,236	
Total revenues		$5,198,770,497	
THE COMPANY PAID OUT OR PROVIDED:			
For raw materials, supplies, and services bought	$2,766,354,971		
Provision for depreciation (wear and tear or obsolescence) of plants, buildings, machinery and equipment and for depletion of coal, iron ore and limestone, etc., by mining operations	270,852,769		
Federal, State, local and miscellaneous taxes	267,462,953		
Interest and other costs on long-term debt (including dividends of $27,265,805 paid to preferred shareholders)	117,724,128		
Total costs		3,422,394,821	
Leaving for wages and salaries of employees, dividends to shareholders, and amount required to be retained by company for needs of the business		*$1,776,375,676	100.00%
***OUT OF WHICH THERE WAS PAID:**			
Employment costs (pay rolls, vacations, social security taxes, insurance and pensions paid to or for account of employees)		$1,474,693,687	83.02%
To common shareholders as dividends		125,126,950	7.04
Amount retained in the business for present and future needs and to assure steady work for employees		176,555,039	9.94
Total		$1,776,375,676	100.00%

Your patronage and the American system of free enterprise have helped make this company an important factor in the steel industry. Our future depends on keeping America free, so that any group of citizens may organize a business, at any time--with the expectation that it, too, may grow strong--provide jobs, supply needed products and achieve success in the next 50 years. In the preservation of the American way of life lies our future hope.

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The Wire Outlook

Business men have been tremendously heartened by November's election results, judging from all reports. It reverses a trend toward, and puts a check on, the "liberalizing" activities of the Administration. Executives can plan with greater confidence than for many years.

The Administration is now said to be advocating a vastly expanded foreign aid program beyond that visualized by the Marshall Plan; to be planning to ask for drastic new taxes to curtail the public spending ability and to be about to demand further regulation of basic materials. Aluminum has already been so affected.

While these measures will be proposed as a means of curbing inflation, it would most certainly have other far-reaching effects. The basic cause of inflation is, (1)—the huge national debt and, (2)—the government's practice of extravagance. We cannot now avoid military expenditures, but we can and should put a stop to social welfare experiments, to bureaucratic spending and to costly price support programs.

Syphoning off the public's money over and above bare subsistance needs can have but one effect—the destruction of thousands of businesses. While the President may not understand the full import of his proposals, his behind-the-scene planners doubtless do, but want these results to be brought about for their own subversive ends.

Happily, the election trend should enable the Republicans, coupled with the anti-"Fair-Deal" Democrats, to control any such efforts to destroy the few remaining vestiges of free-enterprise principles that made America great, prosperous and strong. The "planners" are about to be manacled.

A nation-wide survey just completed indicates that a short-lived contraction of business is in the offing, brought about by the recent curbs on building and installment buying, but it is anticipated that military expenditures will have taken up the slack by next Spring. The budget for military needs alone is expected to be 59 billions for next year. Total production is expected to rise about 5% in 1951, most of the increase going into military goods.

Industrial expansion is to be more and more emphasized by government officials, who flout the fears of excess capacity. The steel industry has, however, made plans to add approximately 10% to its capacity by the end of 1952, yet government planners urge even more. Production expansion from 1945 to 1952 will have added 22% to the nation's steel making capacity.

Shortages in non-ferrous metals are becoming increasingly acute, most of them accentuated by government stockpiling. The situation is bringing a return of our old friends, the gray masked racketeers, who are exacting exhorbitant prices on aluminum, copper, brass, tin, zinc and nickel from those who are in dire need of these metals. Some of the larger wire mills, have had to curtail galvanizing operations for lack of zinc.

Pressure on wire mills for deliveries is heavy and unrelenting; the fact is that wire supplies are very short, in spite of the mills' efforts to do everything humanly possible to keep pace with demand. There has been a heavy influx of DO orders although the full import of these will not be felt for some months. Signal wire is a case in point, many thousands of which are now in the process of being made.

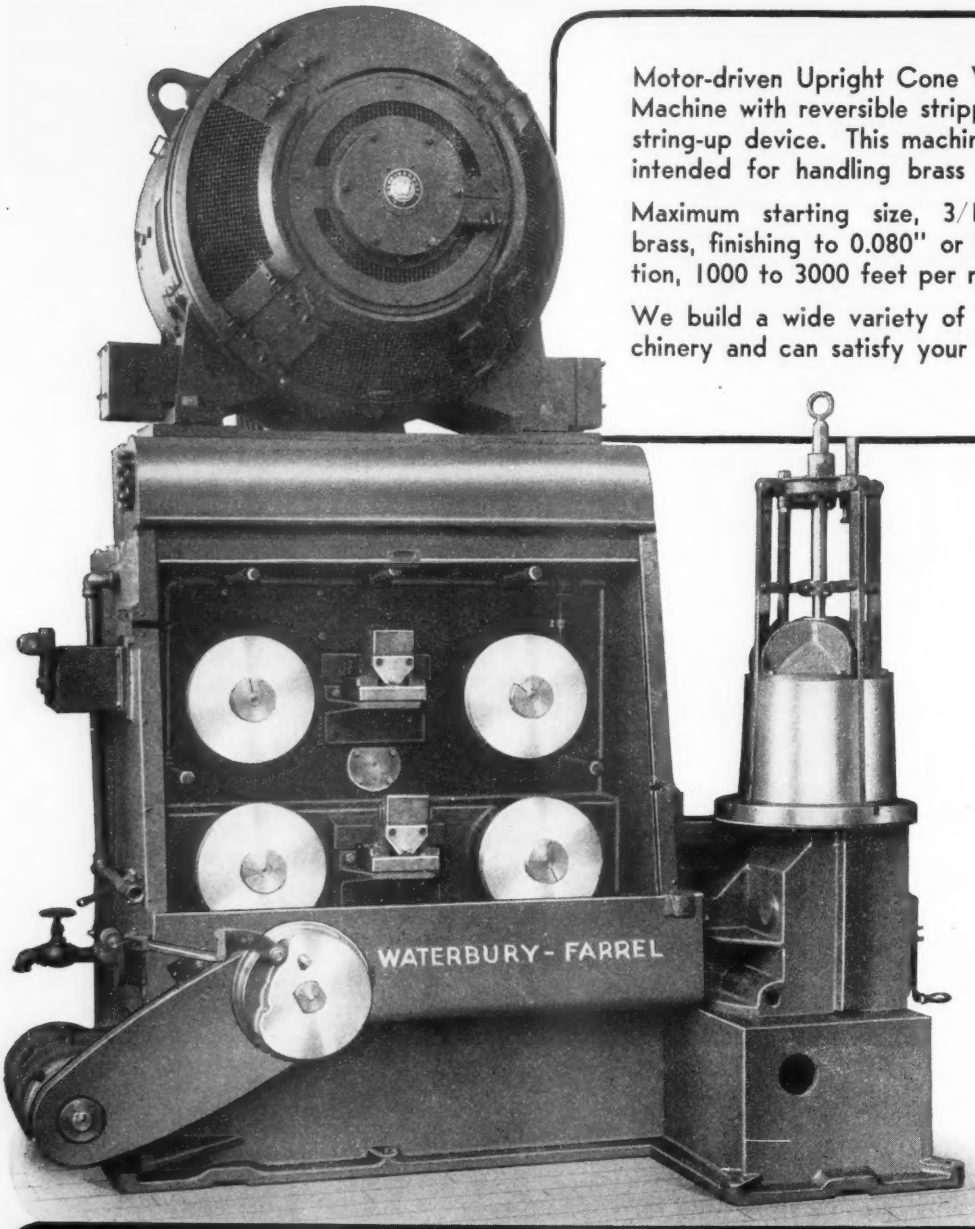
Demand for bolts and nuts is active and manufacturers could easily work two and three shifts; they are generally limited to one shift for lack of wire. A summary of the picture is that inventories of wire and wire products are low both with fabricators and distributors. Most of the news today relating to wire has to do with price increases. Some few basic prices have been adjusted downwards, but with prices on extras going up, the net result is an overall increase. Add to this a growing shortage of workers and it is not hard to see that management has its problems.

Whether we like it or not the Government is back to running people's daily lives. We are again in an era of economic planning, forced on us by re-armament. It will probably be carried on after this period of inflation spends itself, in an effort to curb the inevitable reaction—deflation. But, fortunately it is doubtful now that we shall advance further toward Socialism, or Government ownership of industry. We may now dare to hope that the Congress, on reconvening, will sharpen its collective pencil to see how and where savings may be made. In such action lies our future solvency and prosperity.

—from the Editor's Desk

Just one in a wide variety of . . . .

WIRE DRAWING MACHINES



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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 25 DECEMBER, 1950 No. 12

Designated as

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Reg. 511,530 U. S. Pat. Off.

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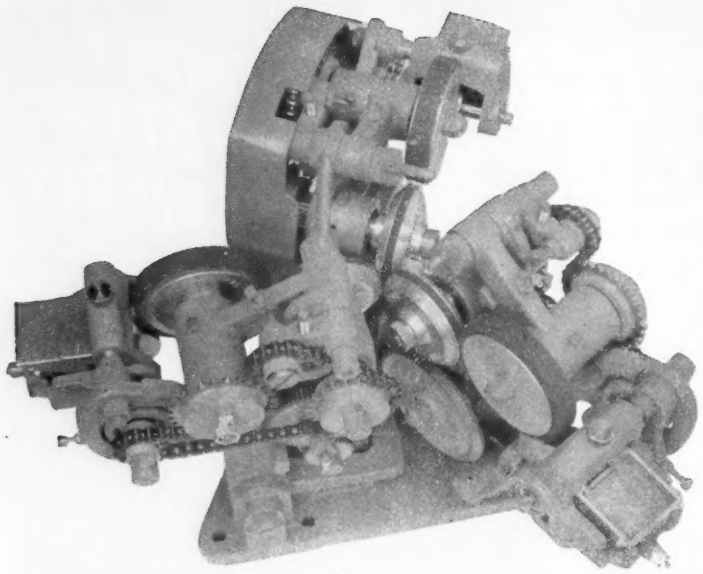
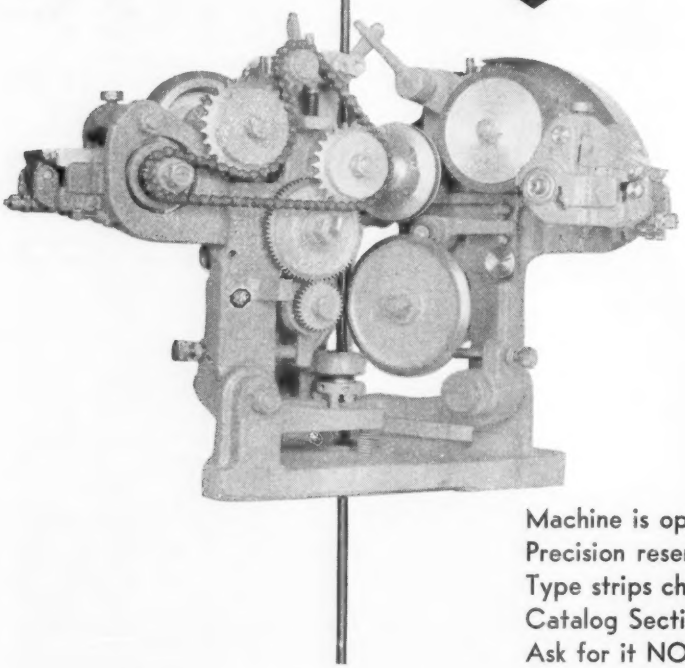


View from above showing arrangement of reservoirs and print wheels.

Side view showing drive mechanism, chain guard removed.



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WIRE
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A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 25 DECEMBER, 1950 No. 12

Polyvinyl Chloride as an Electrical Insulating Material

By James E. Flood, Chemical Engineer
The Plastic Wire & Cable Corporation
Jewett City, Connecticut

With the remarkable growth in the use of plastics, there is a need for appraising the properties that the many forms of these materials take. Mr. Flood, in his article, presents additional data based upon practical wire manufacturing experience.

THE use of synthetic resins for the insulating of electrical conductors has increased considerably in the past fifteen years. This expanding market, considering both the poundage and number of types of synthetic materials used, has shown its greatest growth in the last ten years. Not only did many of these materials fill a vital war need during World War II, but most of them have assumed even more important roles under a peace-time economy.

★ ★ ★

OUTSTANDING among these new materials which have grown so rapidly are the plasticized polyvinyl chloride and polyvinyl chloride-acetate resins. These plastics have proven to be versatile, all around, general-use insulating and jacketing materials. This is evidenced by their widespread adoption in the wire and cable field in a wide variety of end-uses. The wide range of properties available in these materials by means of proper formulation and the facts leading to their adoption in many major fields of use are described herein.

★ ★ ★

Polyvinyl Chloride As An Insulating Material

POLYVINYL chloride and polyvinyl chloride-acetate resins are hard rigid polymers generally supplied in powder form ranging from 40 to 100 mesh. In this form, they are not suitable for uses requiring a flexible material and modification with other materials is necessary to produce an elastomeric composition to fill the requirements of the intended use. Of prime importance among these modifiers is the plasticizer, which, when mixed with the polyvinyl chloride resin, allows a wide range of flexibility to be obtained. Flexibility is, of course, dependent on the percentage and type of plasticizer used.

★ ★ ★

PLASTICIZED polyvinyl chloride mixtures are further compounded with certain basic salts such as lead salts, which serve as stabilizers during the high temperatures of extrusion. Other compounding additives include lubricants, fillers and colorants.

★ ★ ★

POLYVINYL chloride compounds when properly formulated and processed are good electrical insulators. They are mechanically strong, nonflammable, age resistant, and unaffected by moisture and most chemicals. By means of proper formulation it is possible to accent essentially any specific property or group of properties. The wide ranges over which physical and electrical properties of polyvinyl chloride compounds can be varied are listed in Table I. It should be pointed out that these data are not indicative of any specific compounds, but indicate the range of properties available in commercially available insulating and jacketing compounds.

★ ★ ★

Flexible Cords

ONE of the most obvious applications in which polyvinyl chloride has found recognition, is

TABLE I

General Properties of Polyvinyl Chloride Wire and Cable Compounds

General Characteristics	Range of Properties	
PHYSICAL PROPERTIES		
Originals		
Tensile Strength (25° C.) psi	1500	3000
Elongation (25° C.)%	200	500
Aged 60 Days @ 70° C.—		
% Original Properties Retained		
Tensile Strength	100	100
Elongation	60	90.0
Underwriters' Laboratories Flame Test	Satisfactory	Excellent
Resistance to Copper Corrosion at Operating Temperatures	Good	Excellent
Temperature Range	—50° C.	105° C.
Deformation @ 120° C. % Orig. Wall Retained		
500 Gram Load	50	85
1000 Gram Load	35	70
ELECTRICAL PROPERTIES		
D.C. Resistivity Megohm/CM @ 50° C.	1.0×10^4	8.0×10^7
Insulation Resistance Constant (K) @ 15.5° C. for 1000 ft. wire	500	10,000
Dielectric Strength (Volts/mil. in Oil 25 mil plate)	500	700
Power Factor @ 60 Cycles 15.5° C.	.070	.160
Power Factor @ 1000 Cycles 15.5° C.	.080	.120
Dielectric Constant 60 Cycles at 15.5° C.	5.0	8.0
Dielectric Constant 1000 Cycles at 15.5° C.	4.5	7.0

the flexible cord field. Here construction and compounds that cover practically the entire line have been listed as standard by the Underwriters' Laboratories, Inc. Such types as POT, SVT, SJT and ST are standards parallel to those of rubber and synthetic rubber. These thermo-plastic constructions are available in an array of brilliant colors to match the never ending design and color features of the home appliances and portable tools on which they are used. Table II gives the Underwriters' Laboratories Type Designations for many polyvinyl chloride constructions and tabulates their detailed classification and end-use.

★ ★ ★

TABLE II

General Classification of PVC Flexible Cords Listed as Standard by Underwriters' Laboratories, Inc.

Underwriters' Designation	Classification	Details
POT	Parallel Cord	Lamp Cord Type
SVT	Flexible Cord—Light Duty	For Vacuum Cleaners, Kitchen Mixers, etc.
SJT	Flexible Cord—Medium Duty	For Refrigerators, Washing Machines, etc.
ST	Flexible Cord—Heavy Duty	Used on Portable Tools, Motors, Portable Power Supply.
XT	Christmas Tree Cord	2 conductor cord for Christmas tree wiring and similar light duty.
CXT	Christmas Tree Cord	2 conductor cord for Christmas tree wiring outdoors.
FXT	Christmas Tree Cord	Single Conductor Christmas tree wiring for light indoor duty.
RSC*	Refrigerator Power Supply Cord	2 conductor parallel power supply cord for refrigerators.
RW*	Refrigerator Wire, Internal	Interior wiring of refrigerators to 80° C.
POTT-64*	Parallel Tinsel Cord	For electric razors.

* Indicates designation sometimes used by the trade but not adopted by Underwriters' Laboratories, Inc.

NOT listed or designated by type letters are many polyvinyl chloride constructions recognized by Underwriters' Laboratories, but not covered by previous standards. A few of the more common of these are: Refrigerator supply cords, electric blanket wire, constructions for internal wiring of appliances, 105° C. appliance wire, and other special constructions.

★ ★ ★

Building Wire

POSSIBLY the first Underwriters' Laboratories, Inc., recognized use of polyvinyl chloride as an insulation was for building wire. As early as 1937, thermoplastic insulated wire without fiberous covering or other outer protection was allowed for rewiring in conduit. The smooth hard surface of the polyvinyl chloride insulation with its smaller diameter made for easier snaking and permitted more conductors per conduit size than the conventional approved type.

★ ★ ★

TWO types of building wire are recognized by Underwriters' Laboratories, Inc., and listed in the National Electrical Code (See Table III). Type T is rated for service up to 600 volts at a maximum operating temperature of 60° C. Type TW has the same rating as Type T but in addition is approved for uses in wet locations. Both Types may also employ compounds listed for use in locations where exposed to oil.

★ ★ ★

ANOTHER widely accepted use of Type T is for the primary conductors in nonmetallic sheathed cables; and just recently, a nonmetallic sheathed cable of all polyvinyl chloride construction has been listed by Underwriters' Laboratories, Inc.

★ ★ ★

Fixture Wire

DESIGNATED by the letters TF and TFF are the recognized fixture wires for the wiring of lighting fixtures. The solid and less flexible strandings are designated TF while those of a more flexible construction are called TFF.

★ ★ ★

BOTH types are rated at 60° C. maximum operating temperature up to 600 volts and are intended for fixture wiring as permitted in the National Electrical Code. A.W.G. #18 and #16 are the only size conductors permitted in this listing.

★ ★ ★

80° C. Appliance and Machine Tool Wire

IN a class by itself, but of prime importance, is the insulation approved for operation at an ambient temperature of 80° C. In A.W.G. sizes #26 to #2000MCM, it is recognized for use at 80° C. maximum operating temperature. Sizes #16 to #26 A.W.G. with a 1/64″ wall thickness are rated 300 volts maximum and #16 to #26 with a 1/32″ wall are rated 600 volts. Sizes #14 to #2000MCM are rated 600 volts with 1/32″ wall and heavier, the wall thickness increasing progressively with the increase of conductor size.

★ ★ ★

THIS type of insulation also conforms to the National Machine Tool Builders Association standards. Its ability to withstand the high operating temperatures, along with its excellent oil resistance make it ideal for the wiring of all types of machine tools.

★ ★ ★

Multi-Conductor Cords

ANOTHER application is multi-conductor type constructions, which are built to customers' specifications and are used as remote control cables for cranes, machine tool wiring, tests sets and all types of portable equipment. In cables of this type where polarity indentification is of importance, great variety can be obtained through the use of the many colors and shades available in polyvinyl chloride compounds and by color striping and insulation with a contrasting stripe.

★ ★ ★

THE cabled conductors or pairs of conductors are usually armored with a specially formulated polyvinyl chloride sheath having excellent resistance to abra-

TYPES SVT AND SJT CORDS. Listed as Standard by Underwriters Laboratories, Inc., 300 volts service maximum. SVT is listed in 2 conductor No. 18 AWG only, SJT in No. 18 and 16 AWG 2, 3, and 4 conductors. Chart II.

TYPE ST CORD. Listed as standard by Underwriters Laboratories, Inc. 600 volt service maximum in sizes No. 18 through 10 AWG., 2, 3, and 4 conductors. Chart II.

80° C. APPLIANCE AND MACHINE TOOL WIRE. Listed by Underwriters Laboratories, Inc., in sizes No. 26 to 2000 MCM AWG at 80° C. maximum operating temperature. This type insulation also conforms to National Machine Tool Builders Association standards. Chart III.

TYPES TF AND TFF FIXTURE WIRES. Listed in sizes No. 18 and 16 AWG for wiring of lighting fixtures and similar applications. Chart III.

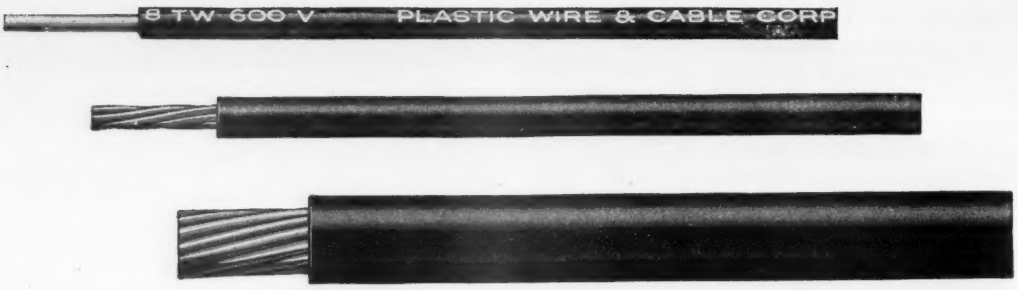
TABLE III

A General Description of PVC Building Wire and Similar Types Listed as Standard by Underwriters' Laboratories, Inc.

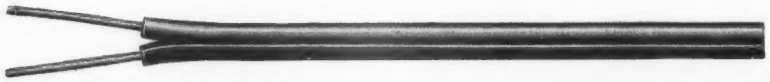
Underwriters' Designation	Classification	Details
T	General Purpose Building Wire	
	(a) Building wire—60° C.	In dry locations.
	(b) Raceway use—60° C.	Where exposed to oil when listed.
	(c) Switchboard—60° C.	General wiring.
TW	Moisture Resistant Building Wire 60° C.	For use in wet locations.
TF	Fixture Wire	For wiring of electrical fixtures, solid and stranded.
TFF	Flexible Fixture Wire	Flexible stranding.
AH*	Appliance & Radio Hook-up Wire	For use in temperatures to 80° C.
MT**	Machine Tool Wire	For use on machine tools and control circuits, switchboards to 80° C.
EB*	Electric Blanket Wire	Heating element for electric blankets to 75° C.
GTO	Gas Tube, Sign and Oil Burner Ignition Cable	For general high voltage use where PVC is used as jacket.

* Indicates designation sometimes used by the trade but not adopted by Underwriters' Laboratories, Inc.

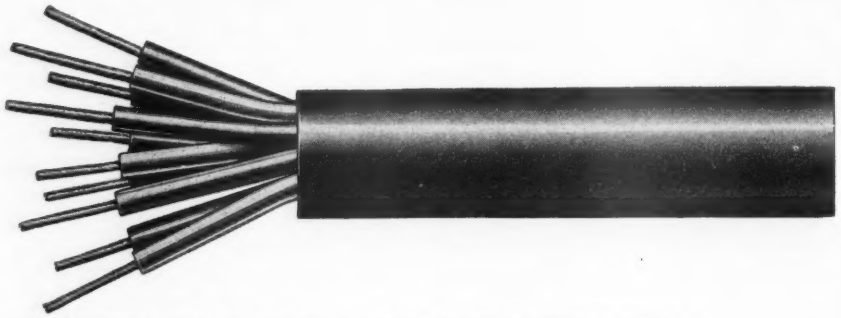
** Machine tool wire not recognized as a class by Underwriters' Laboratories, Inc.



TYPES T & TW BUILDING WIRES. Listed as standard by Underwriters Laboratories, Inc., for 600 volt service in sizes No. 14 AWG to 2000 MCM at 60° C. maximum operating temperature. Chart No. 3 for reference.



TYPE POT CORD. Listed as standard by Underwriters Laboratories, Inc. 300 volts service maximum in sizes No. 18 & 16 AWG.



Multi-Conductor Cords. For portable power control cables, switchboard control, etc.

sion, moisture, flames, and oil as well as outstanding flexibility.

★ ★ ★

Application in the Telephone Field

INTERIOR-TYPE telephone and telephone-duct wires insulated with polyvinyl chloride have found wide acceptance. Their neat, smooth appearance and colors blend well with baseboards and walls in homes and offices. Duct wires are easily pulled through ducts, require no outer coating and are easily identified for polarity.

★ ★ ★

MULTI-PAIR telephone cables for switchboard, interoffice, and building wiring are rapidly growing in popularity. These cables, designed with anti-cross talk construction and jacketed with special polyvinyl chloride outer sheaths are rapidly replacing the paper insulated types with outer braid binder.

★ ★ ★

Department of Defense

OUR Army and Navy were among the first agencies to recognize the use of polyvinyl chloride for their vital requirements. The actual wire and cable uses of polyvinyl chloride by these two agencies are too numerous for description in this article, but the general characteristics of flame resistance, moisture resistance, and oil resistance, have been of value in the construction of military equipment.

★ ★ ★

Conclusion

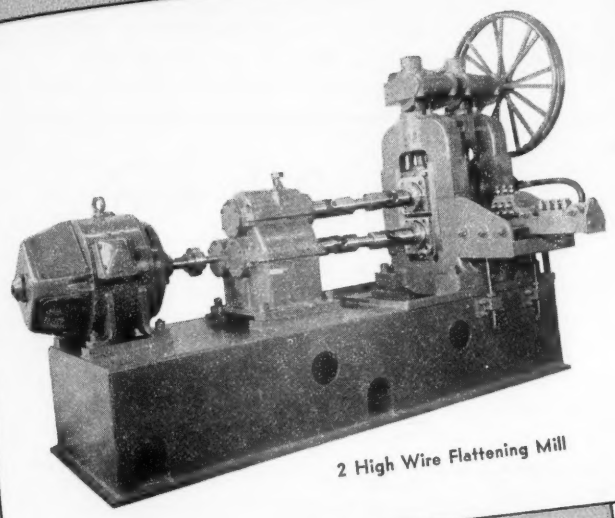
IT is apparent that the end-uses of polyvinyl chloride installations and jackets are continually expanding in the wire and cable field. Manufacturers of the base resins and plasticizers are to be commended for their progressive improvements in their products and the development of new materials. These improvements and new products have enabled the wire and cable manufacturer to find new and wider outlets in chemical plants, railway systems, municipal installations and scores of others.

(*Please turn to page* 1090)

Wean

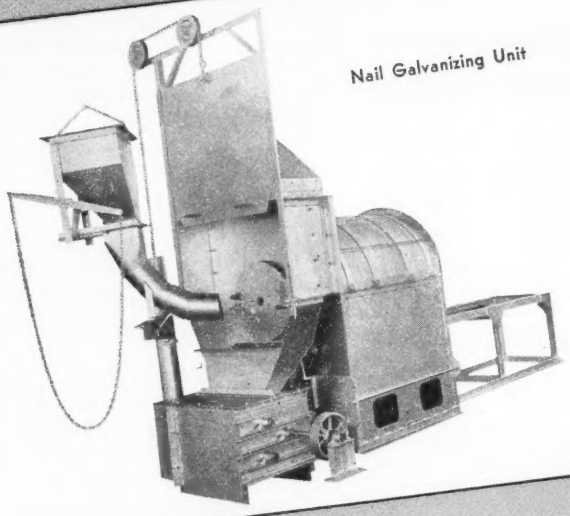
Equipment Corporation

CLEVELAND, OHIO

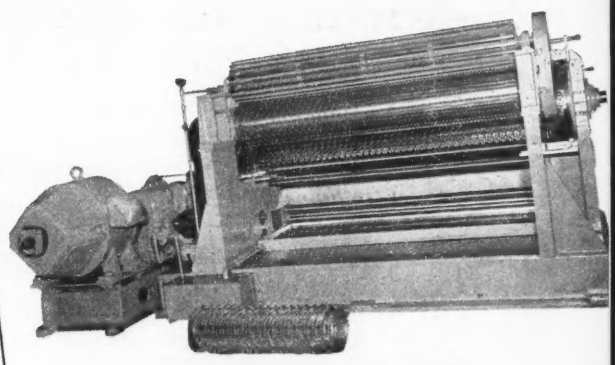


2 High Wire Flattening Mill

Wire Galvanizing Take-Up Frame



Nail Galvanizing Unit



Hexagon Netting Machine

IN the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

THE Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

LOOK TO WEAN FOR WIRE MACHINERY—PROCESS OR PRODUCT

PAPERS PRESENTED AT THE
CLEANING AND COATING SYMPOSIUM AT THE
WIRE ASSOCIATION CONVENTION — BALTIMORE, MD., OCTOBER, 1950

"Lubricant Coatings on Wire for Bolt and Rivet Manufacture"	W. E. Hill, Jr.	Russell, Burdsall & Ward Bolt & Nut Co. Portchester, N. Y. & Rock Falls, Ill.
"Sulphuric Acid Cleaning and Coating of Rod and Wire in a Straightline Operation"	R. H. Hertzog	John A. Roebling's Sons Company Trenton, N. J.
"Chemically Applied Coatings for the Drawing of Wire"	J. F. Leland	Parker Rust Proof Company Detroit, Mich.
"Molten Salt Descaling"	H. Clark Smith, Jr.	Wilber B. Driver Company Newark, N. J.

Lubricant Coatings on Wire for Bolt and Rivet Manufacture

By W. E. Hill, Jr., Plant Superintendent
Russell, Burdsall & Ward Bolt and Nut Company
Rock Falls, Ill.

LUBRICANT COATING is a lubricant applied as a dip coating to rods prior to drawing. No other lubricants are needed in the die box during the drawing operation.

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THE objective of this paper is to show what has been done to date with lubricant coatings, as applied to the bolt industry. Being more definite, how lubricant coatings can produce a Universal Bolt Making Finish on wire, thereby requiring an inventory of wire with only one finish in a bolt plant.

★ ★ ★

WIRE with a Universal Bolt Making Finish can be processed into any style of bolt or rivet on any type of equipment, that is, cold headed on an open die or solid die header, or on boltmakers. It can be extruded, double extruded, swaged, pointed in the die, or processed with driven shoulders. We have experimented with lubricant coatings for the past four years, striving towards this Universal Finish.

This is one of the four papers comprising the Cleaning and Coating Symposium presented at the Annual Wire Association Convention, October, 1950.

★ ★ ★

IT should be stated at this time, that the drawing of the wire (mainly one and two draft work) has been simple. Also, it has been comparatively simple to produce a finish which would work on any one of the above operations. However, the **task** has been to produce a finish which would work on all of the above operations. The greater part of this task has been completed. We have processed approximately 1,000 tons of wire satisfactorily with this Universal Finish.

★ ★ ★

WHY DO WE WANT A UNIVERSAL FINISH? This question can be answered in part as follows:

1. It would give full control of the finish to one man, and one man alone—the rod cleaner. No longer would it be dependent upon the wire drawers and the mixer of drawing compounds.
2. A consistent finish would be obtained, and this consistent finish would be uniform on wire regardless of when or by whom it was drawn.

(*Please turn to page* 1074)

Biography

William E. Hill, Jr., Assistant Superintendent, Russell, Burdsall & Ward Bolt and Nut Company, Rock Falls, Illinois.

Received his education at University of Illinois, and later transferred to Missouri School of Mines and Metallurgy. Graduated from there in 1942, with a B.S. Degree in Metallurgy.

After graduation, he went into the employ of Columbia Steel Company, Pittsburg, California, in the Metallurgical Department. Remained there for a period of two years. Entered the United States Navy in 1944. After separation from the Navy, went into the employ of Russell, Burdsall & Ward Bolt and Nut Company at the Rock Falls Plant.

Sulphuric Acid Cleaning and Coating of Rod and Wire in a Straightline Operation

By R. H. Hertzog
John A. Roebling's Sons Company
Trenton, N. J.

THE predominant method of removing scale from carbon steel rod and wire is acid cleaning or pickling. Of the various acids used for this purpose in the United States, sulphuric acid far outranks all others, chiefly because of its cost as compared to other acids. Straightline cleaning of rod and wire in sulphuric acid, as practiced by the Wire Mills Division of John A. Roebling's Sons Company, is hereby described together with the coating practices following cleaning. Since various wire mills have their own peculiarities in performing the same general operations, the methods covered in this article must be accepted as those which we have found best for our mode of operation.

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ALL raw rod, patented rod, and patented wire down to .090" diameter are cleaned and coated in a straightline operation. The foregoing includes the entire range of analyses handled in the mills. Figure 1 shows a plan view of the cleaning unit. The dimensions of the unit proper, excluding the Scale Office and Instrument Room, are 275′ x 32′. Individual items of equipment starting at the entrance end are Scale Office, Loading Rack, Copper Coating Tank, Water Rinse Tank, 4 Sulphuric Acid Cleaning Tanks, Water Rinse Tank, Pressure Water Spray Tank, Sull Rack, 2 Borax Coating Tanks, 2 Lime Coating Tanks, Drip Rack, 5 Morrison Flash Bakers, Instrument Room, and Unloading Rack.

R. H. Hertzog, John A. Roebling's Sons Co., Trenton, N. J.

Paper for presentation before "Wire Association" Baltimore, Md., October 24, 1950, Lord Baltimore Hotel.

★ ★ ★

ALL material into and out of the cleaning unit is handled by means of boom trucks. Handling over the line is done by means of 2 gantry cranes, one of which is called the Acid Crane and the other, the Coating Crane. The usual hairpin hooks or pins are used to carry the rod or wire in and out of the various tanks.

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THE sulphuric acid tanks have inside dimensions of approximately 11′x12′x7′. General height of the liquid level is 64" which is equivalent to approximately 5200 gallons of acid solution. Depending on the size of the coils being cleaned, each sulphuric tank can hold 3 to 5 pinloads. All the other tanks were designed to handle 1 pinload at a time and are, therefore, proportionately smaller.

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LIVE steam is used to heat the cleaning and coating tanks with the exception of the borax coating tanks which are heated by closed steam coils. The flash bakers are oil fired. Tempera-

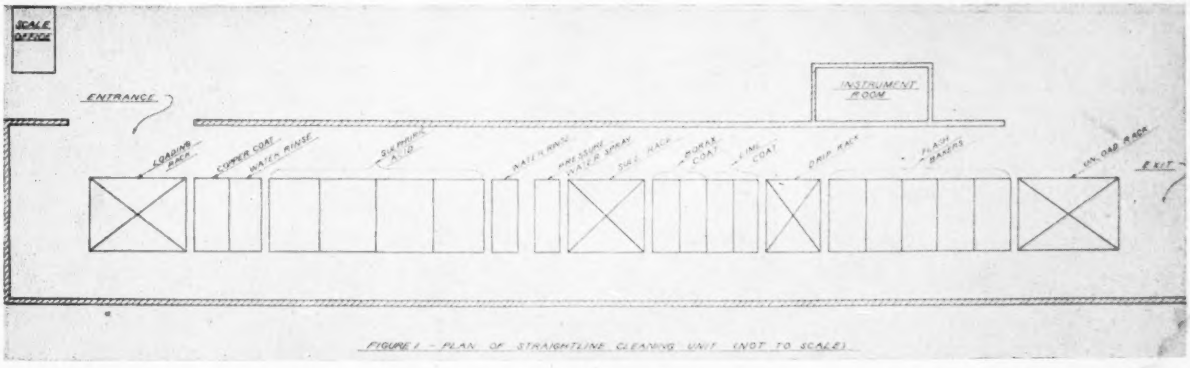

Fig. 1.—View of Cleaning Unit

tures are automatically controlled throughout by proper instrumentation.

★ ★ ★

NORMAL operations require the following personnel per shift:

1—Scale Clerk
2—Loading Boom Truck Operators
1—Band Cutter
1—Acid Crane Operator
1—Coating Crane Operator
1—Acid Man
2—Unloading Boom Truck Operators
9 Men Total

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THE above force is considered a two-crane operation crew. Whenever either of the cranes is down for maintenance or repairs, the remaining crane handles the entire line from start to finish. In this case, the operating crew is decreased by one crane operator, one loading boom truck operator, and one unloading boom truck operator.

★ ★ ★

THE sulphuric acid cleaning solutions are initially made to a strength of 7½% by volume or 13% by weight of acid. Inhibitor and foam blanket materials are added. No further acid additions are made during the life of the solution which is 24 hours. For the first 8 hours of operation, solution temperature is maintained at 140°F., during the next 8 hours at 150°F., and during the last 8 hours at 160°F. When the acid solution has reached the end of the life cycle, the spent acid is discharged into a neutralizing pit where it is in contact with wire scrap. When neutralization is complete, the liquor is pumped into a tank car and shipped to an outside concern where the iron is recovered for use in pigments.

★ ★ ★

BORAX coating solutions are made to a strength of 10- 12 ounces of commercial borax per gallon of water. A wetting agent is added. During operation, periodic additions of borax are made to maintain the original concentration. The solution temperature is controlled at 200°F. The life cycle of a borax tank is approximately 1 month. Changing to a new solution in a tank is only necessary because of accumulated foreign material and not because of solution deterioration.

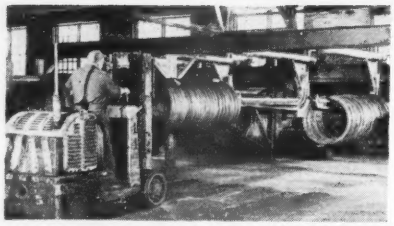

Fig. 2.—Slipping the load on a cleaning pin.

★ ★ ★

LIME coating solutions are made to a strength of 8% by weight of lime. Hydrated bag lime is used for original make-up and for additions to maintain the original strength. Temperature is controlled at 200°F. Agitating pumps stir the lime.

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THE copper coating solutions are made with a proprietary copper sulphate compound. The acid strength is 3% by volume of sulphuric acid and the copper sulphate compound is added in the amount of 4 ounces per gallon. Solution temperature is maintained at 150°F.

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THE flash bakers are maintained at 550°-600°F. in the drying chambers. The firing chambers operate at approximately 900°F.

★ ★ ★

CHANGING of the various tubs, control of concentrations, etc., is done by the acid man according to standardized procedures. Complete titration apparatus is on hand for use by the acid man.

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WEIGHT of rod or wire per cleaning pin varies with diameter of rod and wire and with block size of the coils. The overall range of weight is 1140-3420 pounds per pin. The minimum weight would consist of 6 coils of patented wire .090″-.120″ in diameter patented on 22″ blocks while the maximum weight would consist of 9 coils of raw rod reeled on 41″ reels. Various in-between standard pinloads are established to cover all sizes handled.

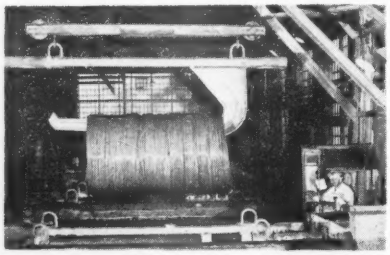

Fig. 3.—Crane lifting a load of 9 coils of raw rod over acid tanks.

★ ★ ★

GENERAL flow of material through the cleaning unit begins on the floor of the Patenting Department or in the Raw Rod Storage Shed, both of which are immediately adjacent to the straightline unit. The loading boom truck lifts the standard number of coils and carries them to the platform scale at the scale office. The weight of the load is automatically stamped on a slip which carries information on heat number, size, type coating, destination, etc. The identification slip is prepared in advance by the Scheduling Department. After weighing, the load is slipped onto a cleaning pin. Figure 2 shows this operation. Each cleaning pin carries an identification number and when the load is placed on the pin, the scale clerk notes the pin number on the identification slip. By the time the load is ready to come off the line cleaned and coated, the identification slip has been transferred to a rack at the exit end of the line.

★ ★ ★

THE load which has been placed on the cleaning pin now comes under the attention of the band cutter. If the material is patented wire, all wire bands are removed and a new loose band is substituted. In the case of raw rod or the smaller sizes of patented rod, all wire bands but one are removed. Bands on the larger sizes of patented rod are not removed or loosened.

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NEXT, the acid crane lifts the load and proceeds through the cleaning cycle. Figure 3 shows a lift of 9 coils of raw rod over the

(*Please turn to page* 1079)

Chemically Applied Coatings for the Cold Drawing of Wire

By James F. Leland
Parker Rust Proof Company
Detroit, Mich.

Paper for presentation before "Wire Association," Baltimore, Md., Oct. 24, 1950, Lord Baltimore Hotel.

CHEMICAL conversion of metal surfaces to assist in the cold drawing of wire is not news to the steel industry. In a measure such conversion coatings as heat oxides and rust coatings as well as the phosphates have been employed for years to cut down metal to metal contact and act as a carrier for the lubricant. However, because very little long range work had been done to get the greatest advantage from the coatings obtained from chemically reactive solutions the methods have appeared costly for the benefits which could be demonstrated.

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ON one development project several years ago a customer described his object in working with us. He was looking for one of three things:

A comparable material for less money,
A better material for the same money,
A more expensive material which would save his mill money and produce a better product.

★ ★ ★

BECAUSE the chemically applied coating seemed to fall in the last classification a great deal of research and field development has been done and is still being carried out in order to obtain more than just acceptable standards of performance and dependability.

★ ★ ★

OUR work on cold drawing during the past few years has followed both the mild steel and the stainless alloy field. As the processes employed in these two fields are quite different they will be discussed separately.

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A PROGRAM for cold drawing of the stainless alloys was instituted about six years ago on tubing. After several years of research and field work a process named Bonderite SS was developed. During this period some work had been done on wire, however, no definite program had been set up around this application. After a period of commercial operation on tubing, a program was started to work out the problems connected with the cold drawing of alloy wire.

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FOR about a year now the process has been operating in the plant of one of the major producers of alloy wire, and with gratifying results.

★ ★ ★

THIS new process, licensed by Parker Rust Proof Company, has the following characteristics: The steel, after it has been properly pickled, is immersed in the coating solution approximately 3 minutes. It is then rinsed by immersion in hot water, after which it is blown dry and is then ready for drawing.

★ ★ ★

THE Bonderite SS solution reacts with the surface metal and produces a uniform tightly adherent oxalate coating which is integral with the metal. The coatings, which are crystalline and porous in nature, pick up the lubricant and act as a carrier through the dies. The improvement in coating uniformity and degree of lubrication has been found to have the following advantages in mill operation:

1. **Easily applied.—Large loads can be handled because separation of the strands is not required as with lead, lime, and some of the dried-on materials.**
2. **Short time required for application.—A load of wire can be coated, rinsed, and blown dry with an elapsed time of 6-8 minutes. The size of the load is determined only by the size of the tank.**
3. **Treats all commercial nickel chrome iron alloys.—This includes the 2-3% straight chromes on to the grades having 50-60% alloying elements.**
4. **Improved surface finish.—Wire produced by this method has a greatly improved surface finish not only because of freedom from scratches, but also because the coating is uniformly applied by chemical reaction and does not pull dents into the metal as do lime, lead, and some of the other materials currently being used.**
5. **Increased drawing speeds.—During the period that the process has been in operation checks showed that when the men were drawing with the oxalate coating they were operating 50-100% faster than when making the same draw with their conventional coating.**
6. **Die Wear.—Die rooms reported a 50% decrease in die polishing and replacement where oxalate coating was employed. On bar shapes where built up steel dies are being employed, the die life has been increased 3-4 times even though greater reductions are being used.**
7. **Coating easily removed.—The coating while not soluble in water is easily and quickly dissolved by a 30-second dip in pickling acid.**
8. **Storage.—The coating is not hygroscopic and under what is considered normal mill conditions there have been no indications that the ability of the coating to draw was affected by long periods of standing even in humid weather.**

★ ★ ★

THE process has been operating on a commercial scale on wire for about 9 months. At present a full-sized pickle house installation is being constructed which can handle 3000-5000 pounds of wire at a time and take full advantage of the "in line" treating procedure which the process makes possible.

(*Please turn to page* 1082)

Molten Salt Descaling

By H. Clark Smith, Jr., General Superintendent
Wilbur B. Driver Company
Newark, New Jersey

Paper for presentation before "Wire Association" Baltimore, Md., October 24, 1950, Lord Baltimore Hotel.

ABOUT six or seven years ago, the Wilbur B. Driver Company installed a molten salt cleaning bath. I am not quite sure what there is about this fact that gives me the right to stand here and lecture about this process. Possibly, it is because in December, 1948, an article printed in the magazine "Steel," referred to ours as the "pioneer installation." Pioneer or not, ours is certainly not a model installation. But if you gentlemen are interested in learning what not to do in setting up such a process, I am certainly the man to tell you.

★ ★ ★

MOLTEN salt descaling as you undoubtedly know is a simple matter of dipping oxidized metal, in our case rods, wire or strip, in molten caustic soda somewhat modified by additions. This immersion for a period of from 1 to 15 minutes is followed by a water quench. There are two competing processes: The Dupont or Sodium Hydride process in which frequent additions of metallic Sodium and gaseous hydrogen are made to the caustic soda, and the Hooker or Virgo process in which an oxidizing salt such as sodium nitrate or permanganate is mixed with the caustic as purchased. The Hooker salt bath operates at from 800° to 1000° F while the Dupont bath operates at a somewhat lower temperature (approximately 700° F). Since my personal experience has been entirely with the Hooker process, I shall not attempt to discuss that of the Dupont Company beyond mentioning that it apparently works well and is preferred by some.

★ ★ ★

AND now to some details of our installation and our experience, or perhaps I should say "adventures" with molten salt descaling. As some of you may know, we are manufacturers of a series of electrical and heat resistant high nickel-chrome alloys. We make Tophet A (80 Nickel(20 Chrome), Tophet C (60 Nickel, 15 Chrome), and Evanohm (a variation of Tophet A containing Aluminum), as well as many of the standard grades of austenitic stainless steel, such as 304, 316, 317, 310, 347, 321, etc. Our pickling practice with these alloys was extremely crude and ineffective before we had molten salt descaling. It consisted essentially of eating the metal out from underneath the surface of the wire until the scale fell off. Metal loss was high and as you can imagine our surface condition was poor. Molten salt descaling resulted in an immediate and tremendous improvement. We now obtain a clean, bright rod or wire from our cleaning house. The metal loss is around 1% and the surface is white and very lightly etched. Our process consists of a 15-minute immersion in the descale bath, followed by a water quench. We then pickle for 3 to 5 minutes in hot muriatic acid and an equal time in an unheated Nitric Hydrofluric mixture. The higher nickel-chrome and some other alloys require a longer acid pickle, in some cases 15 to 20 minutes, but we still get a nice product.

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OUR descale furnace is in a sheet metal shed outside the pickle house. This was made necessary in part by lack of space inside, but I have always felt it was really put there because we were a little afraid of it. Probably for the same reason, our quench tank is a good healthy 35-feet from the furnace. I can assure you that these precautions are unnecessary. Properly designed and installed the descaling furnace and quench tank can be adjacent to each other and to acid tanks. This can be incorporated in a straight line pickling operation and we hope will soon be so installed in our new pickle house.

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OUR original descaling furnace was modeled after a kitchen stove: a pot with a gas flame under it. This was very cheap to build and nearly cost us our shirt to maintain. Sludge falling off the rod and dropping to the bottom of the tank had an uncanny aptitude for missing the tray that was meant to catch it. In spite of a weekly schedule of emptying this tray, the sludge built up in the bottom of the pot to a depth of two or three inches in a matter of three months. Apparently, even a ½" layer of this sludge is a very good insulator; for our pot bottom would run hot, and burn out with great regularity. As a result, we became very adept at pumping out our salt bath in a hurry and equally adept at rebricking our furnace.

★ ★ ★

EVENTUALLY, however, having become so adept that the operation was no longer any fun we decided to redesign our furnace. The present furnace is rectangular, having 3 rows of radiant cup gas burners firing at the sides of the pot, the lowest well above the bottom of the pot and the highest well below the liquid level. The products of combustion are carried along the sides to one end of the furnace, down under the hearth

and out a flue at the other end. This was a fairly inexpensive unit to build and has been most satisfactory. We pumped it out for inspection every three months for awhile and then every six months. After two years, we changed the pot. The old pot was still in sound condition, however, and showed no sign of burning or metal attack even at the welds.

★ ★ ★

THERE are several other and and better methods of heating this bath. One of the best, I am told, is the immersed electrode. This, however, is quite expensive. The gas fired immersion heater is also very good, but requires a much larger pot for high production to allow room for the required tube surface. The most highly recommended is, of course, the electrical resistance furnace using Tophet "A" ribbon.

★ ★ ★

WITH a well designed furnace, there should be little necessity for removing the salt, but I should like to recommend nevertheless that you give due consideration to this matter. The first time our pot sprang a leak we let the salt solidify and tried to break it out with a sledge hammer. We ended up using an air gun and it took a week to get it out. We then bought a hot caustic pump. This was apparently made to fit on a round pot about the size of a 55-gallon drum. It was essentially a sump pump with a vertical shaft, an iron impellor and a ¼" H.P. single phase motor mounted on top of a cast iron disc which covered the top of a drum. We slung it from a crane and rigged it with a black iron discharge pipe in such a way that we could swing the pipe from one to another of a number of drums lined up in a row. This scheme went awry because the motor was exposed to reflected heat from the walls of our rectangular pot, and the over-load device kicked out. I remember one cold winter day when we pumped for ten minutes and then waited for an hour for the motor to cool off. To help it along, we would bury it in a snowbank outside the door. It took us all day to pump out that time, and the snowbank was all gone when we finished.

★ ★ ★

WE then rebuilt the pump in the form on an inverted "L". The motor which we replaced with a 1 H.P., 3 phase, is mounted horizontally at one end of the "L". The pump which forms the vertical leg of the "L" is driven through a flexible shaft. The "L" is equipped with an eye at the balance point, and is slung from a hoist and lowered into the pot in such a way that the motor extends beyond the side of the pot and is thus protected from the heat. This works very well. We can empty the pot in about a half-hour now with very little fuss or excitement. Here are some of the troubles to avoid. Equip yourself with a sufficient number of sheet metal drums without heads and make sure they are dry and in good shape. We use the light metal ones that are used to ship the Virgo salt. Arrange your drums in a semi-circle or straight lines within reach of your delivery pipe and spread a two-inch layer of sand around them to stop leakers. Molten caustic will find a very small hole and it is surprising how long it takes to freeze up. Use a long hook or pole to move your discharge pipe from one drum to another and stop your pump while moving. Before you start be sure you can reach all of your drums, because once they are full, you won't be able to touch them for hours. Even though you install a good pot in a good furnace, I would recommend equipping yourself to pump it out. I would also recommend pumping it out and inspecting the pot at reasonable intervals, if only to clean out the sludge.

★ ★ ★

IN fairness to my good friends of Hooker Electrochemical Company, I must tell you that our experience with this process has not been all headaches. Frankly, we are so dependent on our descaler that if we did not have it, we should have to double the size of our Pickle House. With careful control of furnace atmospheres, you can pickle some of the stainless grades without it, but metal losses and acid consumption are high and surface finish is poor. The higher nickel-chrome stainless grades, such as 310 and 321 are much more difficult and the Tophets are all but impossible without descaling.

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IN July of 1947, we decided to run a series of analyses to determine what changes in bath composition were occurring in the hopes of relating this to the descale efficiency of the bath. The bath had shown a tendency to become sluggish after extended use. Or, to be more accurate, we periodically ran into pickling difficulties which we felt might be the fault of the descaling bath. Also, it was obvious from an inspection of the drag-out salt that there was an abnormal build up of chromates after about a two-month period. I am told that this build-up of chromates appears to be peculiar to our operation, namely treatment of very high chrome alloys such as Tophet A.

★ ★ ★

ACCORDINGLY, we set up a timed pickling cycle to correlate the effectiveness of the descaling bath with changes in chemical composition of the salt. To standardize the quantity and quality of the scale, we cut all test pieces from the same coil of hot rolled and annealed Tophet A rods. Each week a test piece was immersed in the descale bath at 1000° F for 15 minutes and water quenched. This piece was then pickled until clean in a number of cycles of the following standard practice: Ten minutes in hot muriatic acid, water rinse, 2 minutes in cold Nitric-HF mixture, water rinse. These acids were mixed fresh for each test and the temperatures and concentrations very carefully controlled.

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AT the start of this series of tests, The Hooker-Electrochemical Company made a change in the composition of the salt, adding a catalyst designed to accelerate the regenerative action of the bath. Over a period of eight months, the test performed indicated that the effectiveness of the

(*Please turn to page 1085*)

A New Method of Storing Rod

By A. F. Anjeskey, Sales Manager
Cleveland Tramrail Division of The Cleveland Crane and Engineering Co.
Wickliffe, Ohio

A paper presented before the Wire Association Convention in Baltimore, Maryland, on Monday, October 23, 1950. The author describes a new method of storing rods and wire that contributes much to efficiency in the handling of materials.

JUST to reminisce a bit, the manufacture of wire is one of the old arts which has passed through stages of improvement in technique, and wire drawing machinery and die developments, resulting in a gradual increase in the production unit so that shortly before the introduction of tungsten carbide dies, the production unit or coil of rod or wire weighed about 165 pounds.

★ ★ ★

THE tungsten carbide die made possible an increase in the weight of the production unit and also created problems of handling, necessitating the use of block stripping cranes and other handling devices.

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TODAY the industry is processing rod in 330 pound, 600 pound and larger units, and handling equipment is playing an important part in making this possible.

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THERE are members of this Association in the audience today who attended the first meeting in Buffalo in 1930 when the late **John R. Mordica** presided as President.

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HAVING also attended this meeting, I recall the reluctance on the part of many then present to disclose or suggest ways or means of solving some problems which were brought up for discussion. There seemed to be an attitude of secrecy, and I don't say this to criticise, it was natural for a wire mill executive to believe that he had some "special" know-how which should not be disclosed to a competitor. Fortunately, this has disappeared. The attendance at these conventions now represents a cross section of small and large wire manufacturers. Problems are discussed freely, and this is as it should be.

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ACTUALLY, the basic problems are the same for all wire plants. Wire is still "pulled" through a hole to produce the production unit regardless of weight. It is drawn in coil form, and all plants must strive to reduce costs. The cost of handling is as important an item of production as other operations, and surely this can also be considered one of the problems of the industry for general discussion.

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IN 1924 the late **Frank Nullmyer,** then Superintendent of the Youngstown Sheet and Tube Company, had the courage to consider an idea which was advanced by our company for reducing handling costs. We received an order from his company and supplied what was then as near as records disclose, a new method of handling rod, from the cooling conveyor to cleaning house or storage, or loading gondola cars for shipment. We designed a twin-hoist, cab controlled carrier unit with a hair pin hook attached to the hoist cables. The hook could be tilted at each end. The carrier unit operated on a rail system of about 4000 feet, around curves, through switches, permitting handling of 3300 pound loads of rod from one point to another without re-handling. This system is still in operation after 26 years, and while today the hair pin hook method of handling and storing horizontally has lost its novelty, I want to emphasize that at the time of this installation there was considerable doubt about the possibility of storing rod four to six coils high. It was believed that coils would "egg-shape" in storage bins, and because the operator of the hair pin hook sat in a cab from 24 to 40 feet above the ground level, he could not insert the hair pin in a unit load of coils without the assistance of a ground man.

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SINCE that first installation was made, others followed. Some consisted of overhead cranes, or with transfer bridges permitting a transfer of the hair pin hook carrier from the bridge to spur tracks, and others with track and switch layouts. The layout of each system was determined by applying the basic principles of materials handling, one of which is "to pick up a load at one point and convey it to its destination without rehandling." This basic principle should be considered in planning any materials handling system regardless of the type of equipment involved.

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I BELIEVE it is interesting and somewhat amusing to disclose some handling costs of rod in the era before the "1929 bust." In 1927, we installed another rod handling system and a cleaning house crane in a mid-western plant, which at that time was processing 36,000 tons of rod annually. After it was installed it was possible to handle 60,000 tons. The handling costs were reduced so appreciably that the purchaser granted us the privilege of making a certified survey, which was approved by the

management. The former cost of handling from the unloading point at the gondola cars to storage or to the cleaning house and delivering the cleaned rod to the draw benches, also including the cost of handling through the cleaning process was $2.22 per ton. By the new method this was reduced to 47c per ton, quite an appreciable saving for the time and on today's wage rates one can imagine what this saving would be.

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HOWEVER, despite the approval of the customer to use the figures, we were somewhat reluctant to do so because this plant, prior to the installation of the handling system, had used handling methods which by today's standards would be very crude. Coils of rod were handled on buggies. Lifting operations were performed at certain spots by hoists with no movement of the load between points except by hand propelled buggies, yet at that time many wire mills were performing their handling operations in a similar manner, and rather than quote savings, we made arrangements for the prospect to visit this plant. Sometimes permission was granted, at other times refused. Fortunately, since the organization of the Wire Association, as mentioned previously, there is now a free exchange of ideas, and wire mill executives do not hesitate to discuss production problems with each other and visit plants.

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INSOFAR as handling is concerned, horizontal storage has been accepted as being the most practical solution to the problem up to this time. Installations have been made handling as much as 1500 tons a day, others as low as 75 tons per day. They vary in binning arrangement. Some users have provided steel bins for separation of sizes, heats and alloys, and this probably has been the only problem the industry has had to cope with, particularly in such plants where a variety of rod must be carried in storage. My own contacts have disclosed that some plants must carry as many as 300 sizes, heats, and alloys, and when it is desired to conserve space, separation is not possible even with an elaborate binning arrangement, resulting in piling one size or grade on top of another, requiring rehandling. Possibly this has become more acute because of the increased demands of users of wire products who, like the automotive industry, require wire of many specifications.

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IN our contacts this problem of separating sizes, heats and alloys has been discussed frequently, and while it is appreciated that the horizontal method of storage reduces handling costs, some consideration was requested for the development of a method of storage which would permit flexibility in storage insofar as separation of grades are concerned, and if this was possible there would be a resultant increase in storage per square foot of warehouse area.

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WE studied this problem as far back as 1940. We had some ideas, but the war prevented any research or experimentation. Finally about three years ago we developed a new method of handling which we believe the wire industry can accept with less reluctance and misgiving than our first efforts in 1924 to promote the original idea of horizontal storage with a tilting hook.

★ ★ ★

I BELIEVE that the vertical storage system with its unique design of expanding hair pin hook and a carrier operating either on a crane, transfer bridge or track and switch system solves the problem of complete separation of sizes, heats and alloys, in addition to providing more storage per square foot of area, and what is equally important, less total cost.

★ ★ ★

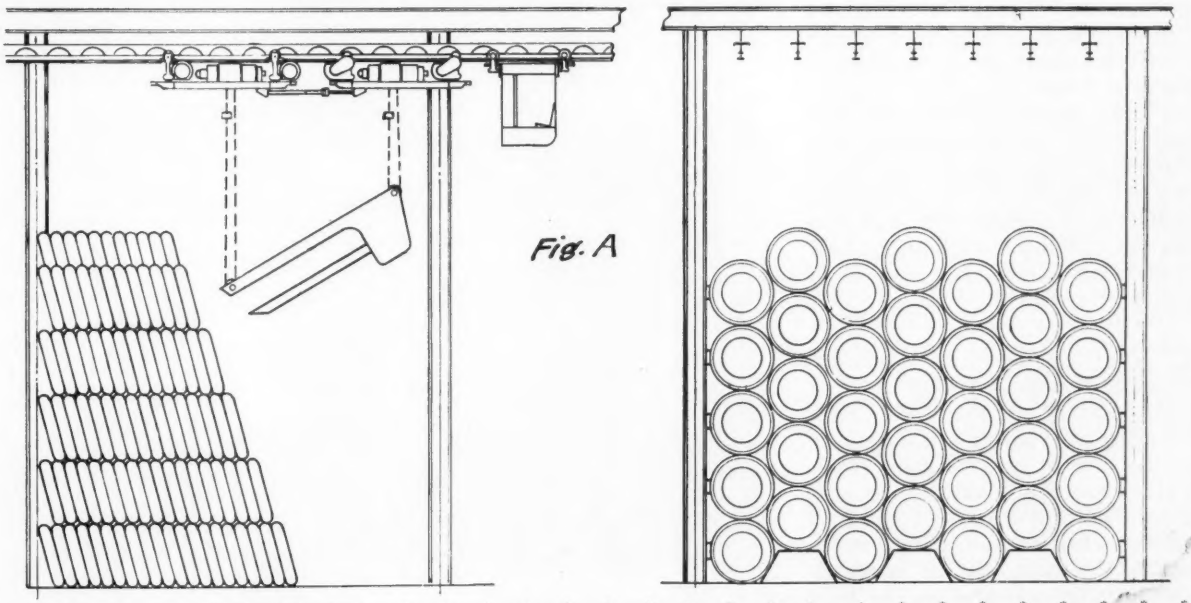

Fig. A.—Rod Storage with Hairpin Hook Carrier

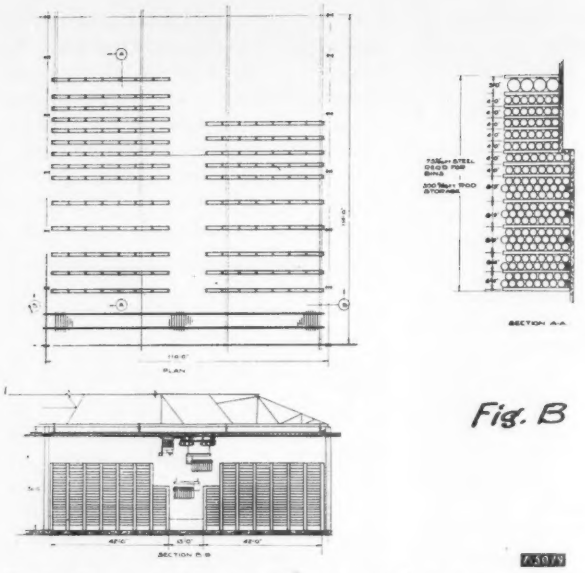

Fig. B.—Diagrams showing horizontal and vertical views of rod storage systems.

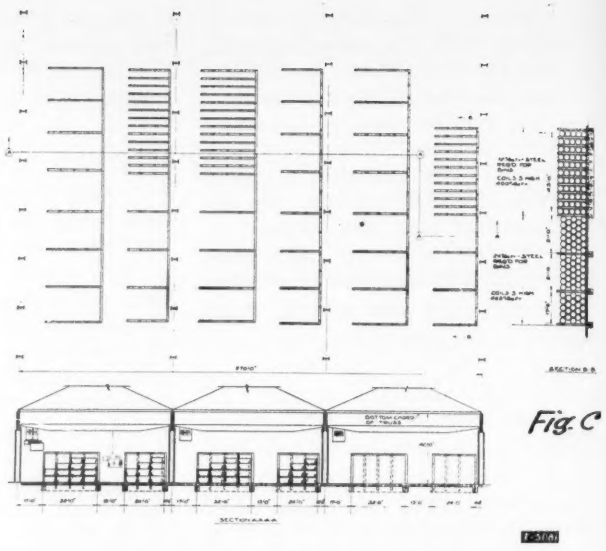

Fig. C.—Rod Storage Systems Plans

HORIZONTAL storage systems with solid piling and no separation between rows provide storage of between 400 to 650 pounds per square foot. Storage capacity is dependent upon the length of the bin which determines the ratio between the amount of rod in storage and the clearance space required at the end of the bin for the hook in the horizontal position, plus the loss of coils in "set back" of the pile.

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WHEN separation of sizes, heats and alloys is necessary, the only way this can be done is by storing in shorter bins or providing structural members or separators between rows or tiers of storage, but this does not provide the flexibility that can be obtained with vertical storage because one tier or row is piled on top of the other, usually 5 to 6 coils high, and separation is limited only to the particular row times the number of layers stored in the row.

★ ★ ★

EVEN if separation is not important, vertical stacking provides more capacity because no end clearance and coil step back is necessary in the bins to provide hook space. This means that a greater net area is available for storing. Studies of various projects now under consideration indicate that as much as 85% of the total area can be used as a net area, on others 67%, yet with this lower percentage of net area more storage is possible with complete separation of grades.

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THE first installation of vertical stacking is in a bolt plant having an area of 60 x 200 feet, or 12,000 square feet of storage space. The portion of the warehouse where the rod is stacked vertically is approximately 39 ft. from the floor to the underside of the building truss. Rod in 49 sizes, heats and alloys can be stacked in vertical columns 22 ft. high with coils laying flat. The calculated storage capacity was determined on the basis of assuming a 330 pound coil of rod, being 6″ thick, 44 coils, providing storage of 14,500# per stack. Tests indicated coils compact so actual capacity has been found to be 20,000# per stack.

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EACH stack is completely separated from adjacent stacks, and the layout of the warehouse provides storage for 234 stacks of 42″ coils or 1700 tons and 184 stacks of 50″ coils or 1322 tons without compacting. Actual capacity because of compacting should be around 4000 tons, if the same ratio

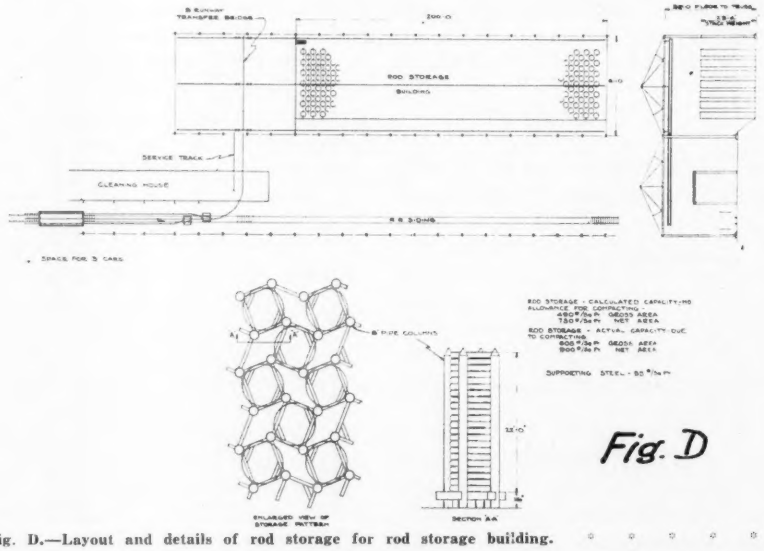

Fig. D.—Layout and details of rod storage for rod storage building.

of compacting occurs with new shipments of rod.

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IN addition, it is possible to maintain a record of rod stored with an inventory sheet equivalent to the floor plan of the storage area. Each stack space can be numbered and shown on the sheet, and as rod is stored, location of storage and weight can be noted so that a more accurate record of rod in storage and its location is available at all times.

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NO re-handling is necessary as it would be with a horizontal storage system when usually one grade is stored on top of another, especially when a heavy shipment is received and it is necessary to conserve storage space.

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IN addition to the advantage of greater storage, the steel required to separate the stacks is less. A survey of several rod warehouses storing rod horizontally has indicated that 72 to 75 pounds of steel is required per square foot of storage area. For solid binning with no separation, 22 pounds of steel is required per square foot of area.

★ ★ ★

WITH vertical stacking 55 pounds of channel and steel pipe is required, a saving of 17 pounds, or roughly 33%, but because of more storage per square foot this saving is greater because less area is necessary.

★ ★ ★

SOLID binning presents problems which were not so serious years ago. There is danger of a pile falling over and mixing varieties. The coils also tend to sag or slip, which does not permit full storage. In some warehouses coils are pyramided to maintain some semblance of separation. This further reduces storage capacity, also increases possibility of a pile falling over, and coils can and have wedged in the pile making it difficult to reclaim from storage.

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IT is apparent therefore that, vertical stacking is more efficient and economical than horizontal storage when separation of grades is required.

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IT should compare favorably against solid binning even when separation is unnecessary, because of greater storage capacity. The hook clearance at the end of a solid bin and coil step backs to prevent pile slippage is wasteful and to some extent dangerous.

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THE vertical storage system is most efficient when the truss height is 39 to 40 feet above floor level. The cost of such building is less than the cost with a lower truss height and more ground area, and for equal storage more handling equipment and bin steel is required.

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THE vertical stacking hook is hydraulically operated with an electric operated motor pump incorporated in the body piece of the hook. Electric power is supplied by flexible cable and take-up reel, as would be required for a magnet. Control is from the cab of the hoisting unit. The back plate or underside of the pin is expanded after being inserted in a unit load of 3300# of rod horizontally or vertically. The coils are held on the pin individually by barbs in this back plate, therefore, no weight or pressure is imposed on the coil at the open end of the hook. In addition, barbs or points enter the end coil on the top side of the pin, as the mechanism is expanded, and when retracted these points clear, presenting a smooth pin for entry into a unit load.

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THE unit is designed to handle coils 36″ OD - 25″ ID to a maximum of 52″ OD to 37″ ID.

(*Please turn to page* 1091)

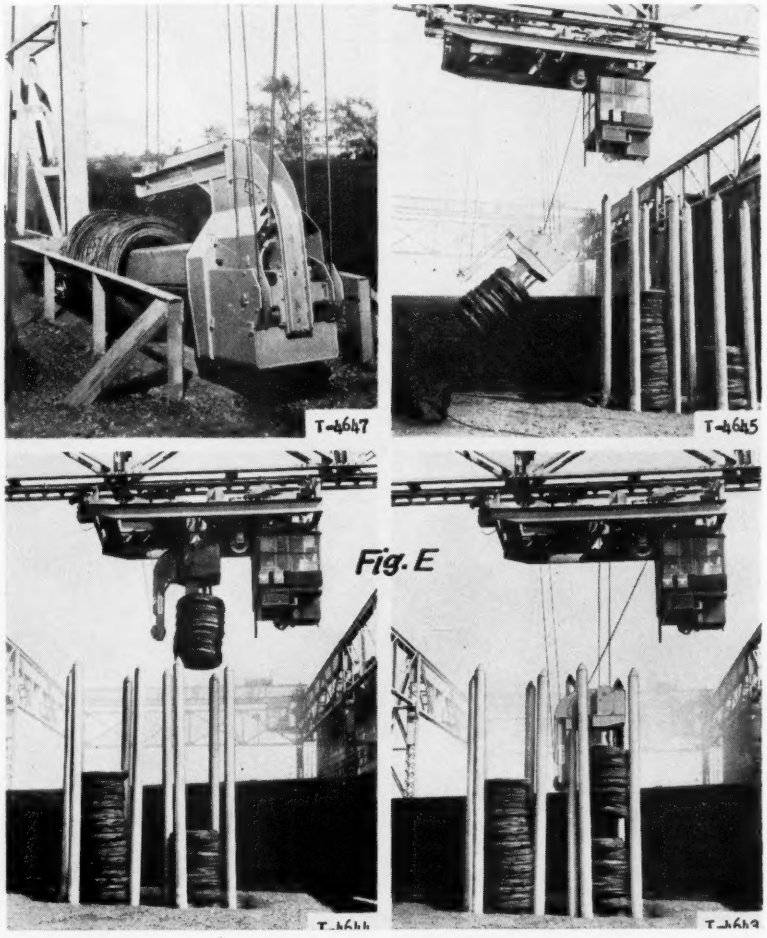

Fig. E.—Views showing actual mechanism for handling and stacking rod coils.

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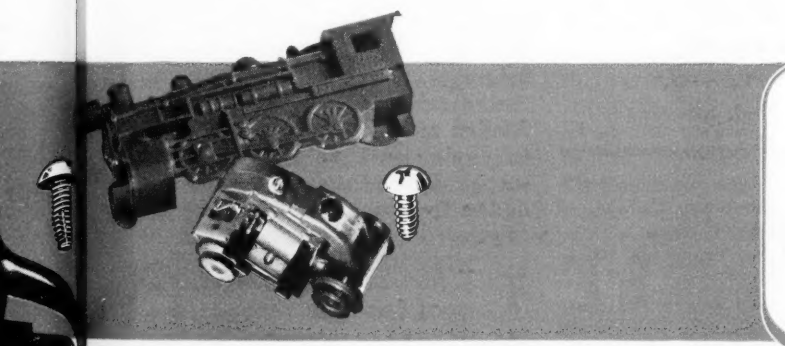

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The Story of the Convention

Each year your Editors provide a thumb-nail sketch of those features of the Convention that can only be understood if one attended in person. The papers and discussions are printed in the magazine from October through January. This story is written to record those other events and impressions that are so important and yet that do not appear on the printed program.

DURING the past several years we have been able to use the term "bigger and better" and yet keep within the limits of conservatism. For the 1950 Convention held in Baltimore at the Lord Baltimore Hotel for the four days starting on October 23rd, we can safely insert the word "much" before "bigger and better"—for it was exactly that! Attendance and registrations were at an all-time high. Four hundred and thirty-seven men registered for the technical sessions and approximately fifty additional persons, not counting the ladies, came on Thursday just for the Bethlehem Steel Sparrows Point tour. These last-day arrivals were not registered. Most notable was the increase in attendance among the non-ferrous men, for whom a larger and more varied program had been arranged.

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TOO much credit cannot be given to the very fine work of the committees, headed by **Carl E. Johnson,** General Chairman. He was ably backed by **L. C. Crewe,** Assistant General Chairman, by **John H. Richards, Jr.,** Chairman of the Ferrous Program Committee, and **Sidney Rolle,** Chairman of the Non-Ferrous Program Committee. Supplementing and assisting them were the members of their committees, who also served as chairmen of the several technical sessions. A complete list of the committeemen who worked so assiduously to complete our interesting program was printed in October.

★ ★ ★

THE Convention officially got under way with the opening of the registration desk at 9 A.M. on Monday. Before getting into the technical meetings, the Directors met for their semi-annual business session at 10 A.M., which was followed by the luncheon annually given by them for the members of the Program Committee and those who were to present papers at the meetings.

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A NEW feature in the holding of technical sessions was originated this year—that of holding ferrous and non-ferrous meetings simultaneously in different rooms. Perhaps a few were disappointed in not being able to attend two meetings at the same time, but these fortunately were few in number and the fact that all meetings were well-attended justifies the conclusion that the new plan was eminently successful.

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Monday, October 23rd—Joint Session

OUR President, **Fred M. Crapo,** opened the meeting with an address of welcome to the three-hundred odd members and guests present, in which he stressed the fact that the meeting held some international significance due to the presence of wire men from ten foreign countries and because wire is playing such an important role in the defense and war activities of the free countries of the world.

★ ★ ★

THE first session, however, was a joint ferrous and non-ferrous one; thereafter each section held simultaneous technical meetings or events, each of major interest to men belonging to one or the other of these industry branches. This session was devoted to materials handling, which has many problems with common denominators.

★ ★ ★

Carl E. Johnson, Supt.
Rod & Wire Mills,
Bethlehem Steel Company
Sparrows Point, Maryland

Born Marquette, Mich. Graduate Mining Engineering, Michigan College of Mines (Now Michigan College of Mining and Technology) Houghton, Mich. 1923. While student spent one year working underground and in the open pit mines of the Marquette and Mesabi Iron Ranges. 1923-1925 open hearth department, Bethlehem Steel Company. 1925-1926, Construction Department, Bethlehem Steel Company during construction of wire mill. Upon its completion in 1926 became Assistant Superintendent. In 1927 appointed Superintendent of Rod and Wire Mills.

Tuesday, October 24th

BESIDES technical papers for ferrous and non-ferrous men in the morning, after lunch for the latter there was scheduled a plant inspection tour through the Breeze Point Works.

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AS noted, the afternoon was devoted to a plant inspection tour through the Breeze Point Works of the **Western Electric Company.** About 160 took the trip. Before starting the rounds of the mill, the group was welcomed by **John H. Scott, Jr.,** who described what would be seen and outlined some recent developments in the manufacture of telephone wire, particularly in Neoprene coated types. Western Electric's guests were then provided with guides who showed them all operations, including wire drawing and flattening, tinsel, paper and yarn serving, pulp insulating, stranding, armoring, mixing of insulants, extrusion, lead casing, dyeing, and many other operations. Various well-equipped laboratories were also visited. For the courteous and attentive consideration shown to their guests, the Wire Association is indebted and grateful to the Western Electric Company, whose operations are not only on a vast scale, but embody the latest and best in equipment and methods.

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Wednesday, October 25th

FOLLOWING the morning's technical meetings, with but a brief interval to freshen up, the Annual Luncheon of the Wire Association got off to a good start at 1 P.M. with the largest attendance for this function ever recorded—one hundred and eighty-two. Through the thoughtfulness of **Mrs. Spengel,** each of the ladies attending was presented with a lovely corsage. Our colorful luncheon-meeting was presided over by President Crapo. His address, covering the medal and certificate awards, and other points follows:

"Members of the Wire Association are guests:

"It is my great pleasure to greet you at this Annual Luncheon of the Wire Association. It is especially gratifying to have this meeting graced and enhanced by the presence of so many ladies. You are most welcome.

"I only regret that Mrs. Crapo is not here; however, I can assure you she will be present at the May meeting in Atlanta because by then we expect to have in our fall and spring crop of grandchildren—and avoiding any unforeseen duplication, by that time, we should have seven, a most appropriate number considering the usual mispronounciation of our name.

"We have here today many members and guests from abroad including: Canada, England, France, Belgium, Germany, Switzerland, Norway, Sweden, India and Australia. It is a pleasure to have you with us."

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AT this point Mr. Crapo read a telegram from **Cy Russell,** expressing his regret at not being able to be with us in Baltimore.

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HE then introduced **Carl Johnson,** paying tribute to him and his committeemen for their splendid work in building the 1950 program. Mr. Johnson told the gathering of the Bethlehem Steel tour planned for Thursday, giving details of what was in store for us.

★ ★ ★

"AT each Spring Meeting of the Board, the Directors select a member of the Association to receive The Wire Association Medal Award in recognition of the most meritorious contribution made to the advancement of the wire industry in the form of a paper presented at any meeting of the Association or published in Wire and Wire Products during the year preceding.

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"IT is with pleasure that I present the 1949 Award to: **John H. Corson** for his paper: "Welding in the Wire Industry."

★ ★ ★

"THE Board of Directors may also, if it so elects, award annually a Certificate of Honorable Mention, Ferrous Division, and a Certificate of Honorable Mention, Non-Ferrous Division, to members making outstanding contributions to the advancement of the wire industry in the form of papers.

★ ★ ★

"IT is a pleasure to present the Ferrous Division Certificate to: **Dartrey Lewis** and **H. J. Godfrey** for their paper, "Back Pull Wire Drawing."

★ ★ ★

"THE Non-Ferrous Division Certificate is awarded to **E. G. de Coriolis** and **O. E. Cullen** for their paper "Protective Atmospheres for Annealing Non-Ferrous Wire." Mr. F. C. Starr will accept the Certificate for Mr. de Coriolis, who could not be here.

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"AS a tribute to **John Mordica** and to memorialize him as the Founding President and Honorary President of the Wire Association until his death in 1937, beginning with 1938 an annual Memorial Lecture has been given during the Annual Convention, known as "The Mordica Memorial Lecture." The Past Presidents of the Association constitute a permanent Committee to nominate each year a candidate for the honor of delivering this lecture. "The very recent revision of our By-Laws provides that a suitable certificate shall be given to the person honored as the Mordica Memorial Lecturer each year.

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"THUS, I have the honor to present at this time, to those who are here today and who have heretofore delivered this lecture, a certificate which reads:

'This Certifies that the Mordica Memorial Lecture Award has been presented to (the recipient) in recognition of his Valuable Contribution to the Advancement of The Wire Industry and to Perpetuate the Memory of John Mordica, one of the Founders and First President of The Wire Association.'

★ ★ ★

"IT is befitting and appropriate that this should be done at this Convention, at which we shall have an opportunity to visit and see what is here referred to as 'The House that Jack Built'—the Rod and Wire Department of Bethlehem Steel Company at Sparrows

(Please turn to page 1072)

THREE WAYS TO REDUCE CLEANING COSTS!!

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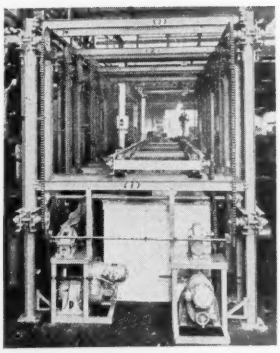
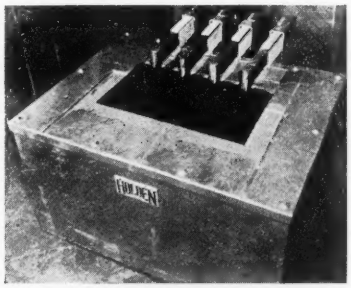
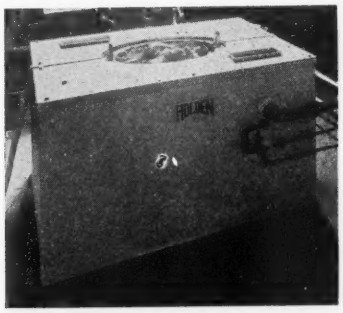
APPLICATIONS—Hardening . . . Annealing . . . Descaling . . . Martempering . . . Austempering . . . Isothermal Annealing and Descaling . . . Stainless Steel Descaling (Sodium Hydride) . . . Sand Removal . . . Bluing . . . Blacking . . . Carburizing



HOLDEN Electrode Furnace with Automatic Conveyor

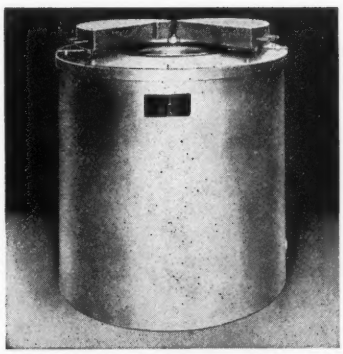


HOLDEN Electrode Furnace

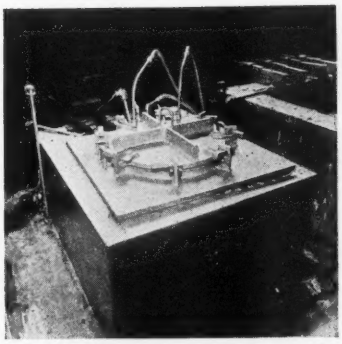


HOLDEN Gas-Fired Furnace

HOLDEN Marquenching or Austempering Furnace—Gas or Electric



HOLDEN Electric Resistance Furnace



HOLDEN Liquid Nitriding Furnace

THE A. F. HOLDEN COMPANY

P. O. Box 1898
New Haven 8, Conn.

11300 Schaefer Highway
Detroit 27, Michigan

Wire Die Bore Profilometer

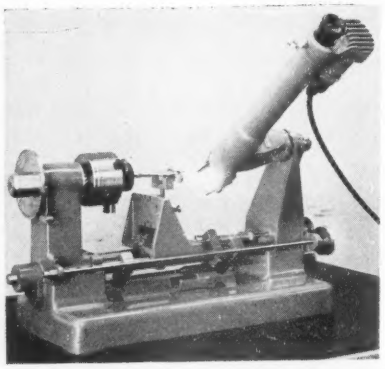
AN instrument has been developed by the British Iron and Steel Research Association for the measurement of bores and profiles of Wire-drawing Dies. Measurements are made by two micrometer screws which read directly to 0.0001 in. in vertical and horizontal directions. An auto collimator is used as a null indicating device.

★ ★ ★

THE instrument is robustly constructed on a cast iron base with rigid head and tail stocks. The headstock carries a 3-jaw chuck which is capable of rotation, and a simple dividing plate which enables the chuck to be positioned at 6° intervals. The chuck carries the component under test. The bed carries the two principal guide ways for the measuring carriage; these are hardened steel rods. The measuring carriage is kinematically mounted on the ways and is traversed horizontally by a one-inch micrometer screw. The motion of the carriage is carefully adjusted so that it is parallel to the axis of rotation of the chuck in both horizontal and vertical direction. Contact between the micrometer spindle and the carriage is maintained by a spring.

★ ★ ★

THE carriage carries a spindle which has 2 degrees of freedom, namely a vertical sliding motion



Wire Die Bore Profilometer

and a limited rotation about a vertical axis. The vertical sliding motion is actuated by a micrometer through a geometrically mounted lever. A mirror is fixed on the bed to assist in reading the micrometer for the vertical movement.

★ ★ ★

FOR convenience of handling, both micrometer spindles are extended and can be operated by two external drums at the right end of the machine.

★ ★ ★

ROTATION of the vertical spindle is made by a screw, and the top of the vertical spindle carries the probe unit. This unit is geometrically mounted on the vertical spindle, giving only a rotational movement about a horizontal axis. The unit carries the probe at one end and a reflector at the other end. A counterweight enables the probe to be biased either to the top or bottom of the bore as desired.

★ ★ ★

THE tailstock carries an autocollimator with a 45° reflector which provides a convenient means

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

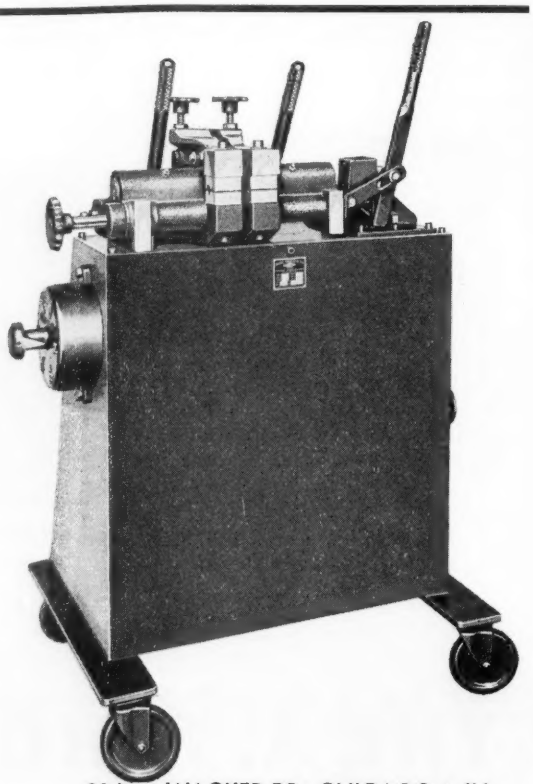
MODEL H-T MICRO-WELD HEAVY BUTT WELDER

A general utility Butt welder for welding Steel (low carbon rods and wire ranging in size from 1/8" to 7/8" diameter.

While this unit was not designed for production line work, the wide range in welding capacity makes it suitable for various types of welding requirements.

Equipped with hand-operated toggle type clamping mechanism, providing positive clamping of the stock. Spring actuated movable welding headpiece and close coupling of the transformer provides high efficiency on the welding current.

General construction of this unit is rugged to resist high upsetting forces, and to maintain accurate alignment of the work. Furnished mounted on 4-wheel truck as illustrated.



MICRO PRODUCTS CO.,

20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

of receiving reflections from the small reflector on the probe unit.

★ ★ ★

TWO spindles on the left end of the instrument provide the connections for the automatic plotting apparatus. ★ ★ ★

THE probe is inserted in the bore and the autocollimator is adjusted until the image reflected from the probe unit reflector appears in the field-of-view of the eyepiece. The adjusting screw immediately below the probe unit is rotated to ensure that the probe point lies on the vertical axis of the bore. This condition is seen as a reversal in the direction of movement of the reflected image in the autocollimator. The carriage is then traversed horizontally by the appropriate drum (the extension of the micrometer for the horizontal movement). This brings the probe on to a different portion of the profile, and the reflector on the probe unit is tilted. The other drum is then turned until the reflected image from the probe is once again restored to its original position, and the micrometer reading of the vertical sliding motion is taken. ★ ★ ★

THE process is repeated as required, and values of the vertical and horizontal micrometers are plotted against each other to provide the profile.

★ ★ ★

THE diameter can be measured at any required point of the bore in a similar manner to that described above, except that two readings in the vertical direction are taken, one on the top surface and the other on the bottom.

★ ★ ★

THE difference between the two micrometer readings plus the diameter of the probe gives the diameter of the bore.

★ ★ ★

THIS instrument, which is manufactured by **Hilger & Watts, Ltd.**, London, is obtainable in the United States from the **Engis Equipment Company,** 431 South Dearborn St., Chicago 5, Ill.

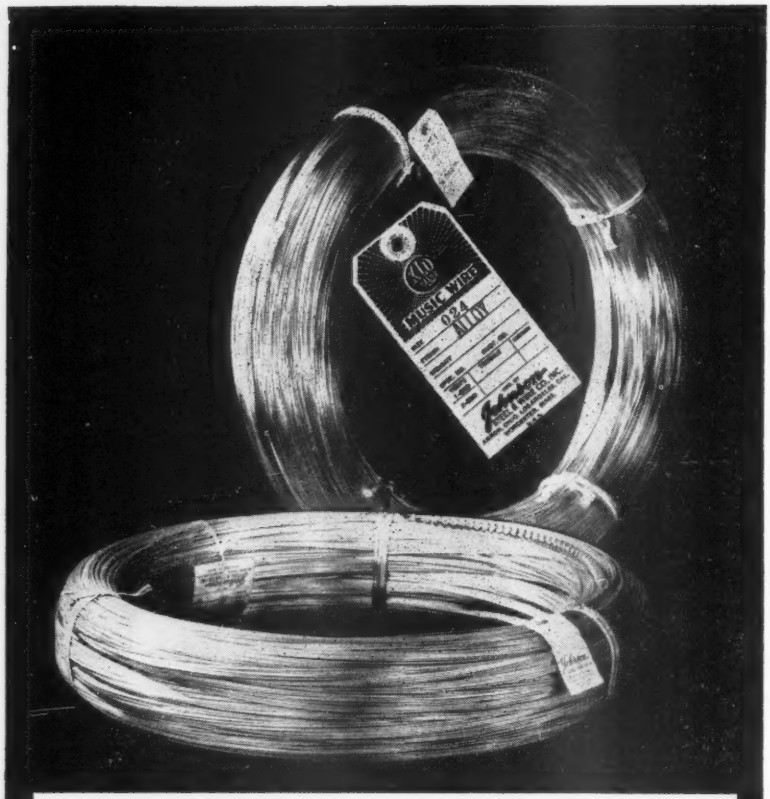
★ ★ ★

Specialized Wire for Specialized Products

This new wire developed by Keystone helps recessed head screw manufacturers to lower production costs. It delivers the desired forming and upsetting qualities uniformly. Because of excellent flow properties — die and plug life are often more than doubled — production records show fewer rejections and reduced inspection time. Keystone Cold Heading Wire is "special processed" for *tough* Cold Heading jobs.

Keystone's process of *drawing after galvanizing* smooths and hardens the zinc coating, increasing its lasting qualities and its physical properties. This shiny smooth finish, corrosion resistant Spring Wire is now available in Type 2 and Type 3 heavy weight zinc coating as well as the regular weight suitable for most applications.

If your product requires "special" steel wire, please consult us.



Good News —

NOW, all Johnson XLO Music Spring Wire is made from imported, improved Swedish rod. Johnson researchers plus the resources of Swedish steelmakers have developed an electric furnace steel, with closely controlled analysis, which is being used exclusively in Johnson Music Spring Wire. The result—more uniformity and added fatigue.

This quality advance is in line with the Johnson policy of giving something better whenever possible.

Ample stockpiles warrant a continuous supply.

JOHNSON

STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.

New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

Wire Association Clock Wound For Another Year

THE 400-day grandfather clock presented to the Wire Association two years ago in Pittsburgh was wound on November 3rd this year by **Mr. S. H. Richards,** Technical Director of the Marshall Richards Machine Co., Ltd., of Durham, England. Mr. Richards was accompanied by **LeRoy D. Seymour,** Vice President of their American subsidiary.

★ ★ ★

OTHERS present were Major Richard E. Brown, Mrs. Ruth S. Spengel, Mrs. Anne L. Edwards, and Edmund D. Sickels, all of the Wire Association offices.

★ ★ ★

FOLLOWING the ceremony, tea was served, which Sam Richards himself prepared in accord with the best of British tradition.

★ ★ ★

THE clock is to be wound each year by one of our British members. A parchment scroll is now being prepared, on which the names of the persons who wind the clock will be suitably inscribed as a permanent record. It will hang by the clock in the office of the Executive Secretary.

★ ★ ★

Washburn Adding New Open Hearth Furnace

WASHBURN WIRE CO., Phillipsdale, R.I., is constructing a new open hearth of 36,000 tons annual capacity that will be in operation about Jan. 1, 1951. The additional open hearth will give the company an annual capacity of about 92,000 tons. Employment will be increased to 750. Washburn Wire Co., with finishing capacity in New York City, makes high carbon specialties, notably valve spring wire, clock and motor spring stock, music wire, razor blade steel, roller bearing and other specialties. The company is also considering a long-range expansion program that would eventually bring its annual capacity to 140,000 tons.

★ ★ ★

"Impakdriver"

WITH a twist in the desired direction and a few raps with a hammer, screws, bolts or nuts can be tightened or loosened easily and quickly with a new, simple hand tool named the **IMPAKDRIVER.** IMPAKDRIVER is constructed on a very ingenious and efficient cam principle that translates the impact from a hammer's blow into an amazing amount of torque.

★ ★ ★

PARTICULARLY useful for starting stubborn nuts, bolts or screws that are rusted or frozen on, IMPAKDRIVER also provides a simple answer for working in hard-to-get-at places. For mechanics, machinists, repair men, maintenance men, etc.,—in fact, for anyone who uses wrench or screwdriver IMPAKDRIVER solves many problems and saves a tremendous amount of time.

★ ★ ★

IMPAKDRIVER is sold by itself or in sets with different combinations of bits and sockets for various sizes and types of screws, bolts and nuts. These attachments have been specially engineered to give best results and are constructed of alloy steel.

★ ★ ★

IMPAKDRIVER is being introduced by **H. K. Porter, Inc.,** Somerville, Massachusetts, makers of bolt cutters and pruning tools and of the Porter-Ferguson Hydro-Method auto body tools and equipment.

★ ★ ★

Chart on Metal Cleaning Government Specification Chemicals

AMERICAN CHEMICAL PAINT CO., Ambler, Pa., has issued a handy chart listing cleaning and surface protective chemicals for metals that will conform to government specifications—useful for concerns doing government work. Copies of this useful compilation may be secured from the company upon request.

★ ★ ★

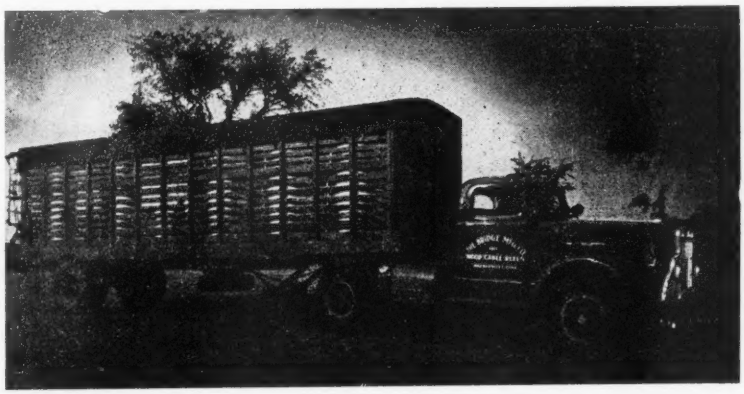
WOOD REELS
with SERVICE plus

If your mill is located anywhere within 200 miles of Hazardville, we will deliver them to your door in BRIDGE trucks—and overnight, in case of emergency.

For points beyond, carload shipments out of Springfield, Mass., via N.Y.C.R.R. can be in cities as far away as St. Louis on the third day. L.C.L. shipments to points like Buffalo or Cleveland via the Pacemaker will arrive the second morning and be delivered to your door *at no extra cost.*

BRIDGE REELS for CABLE, ROPE and WIRE are made in returnable and non-returnable types in sizes from 12" to 96" in diameter.

ALSO, REELS, HEADS FOR STEEL DRUMS BRIDGE SHIPPING and SHOP REELS are furnished assembled or knocked-down, made to your specifications. Built to withstand severest handling.



You are invited to avail yourself of our unique and efficient service and to visit our plant to see how BRIDGE REELS are made so well and why they are so sturdy and low in cost.

Send us your specifications and let us quote on costs.

BRIDGE MFG. CO.
Inc.
HAZARDVILLE ● CONNECTICUT

Outstanding Personalities of the Wire Industry

P. H. Devaney Promoted by Jones & Laughlin Steel

J. B. MITCHELL, vice president-operations, **Jones and Laughlin Steel Corporation,** has announced the appointment of **Paul H. Devaney** as general superintendent at Aliquippa Works succeeding **Howard F. Martin,** who has been transferred to the office of the vice president-operations as operations consultant.

★ ★ ★

MR. DEVANEY was first employed at Aliquippa Works as a millwright helper in 1924. Since that time, he has advanced through various supervisory positions until his appointment in 1947 as assistant general superintendent.

★ ★ ★

HE was graduated from Ohio State University with a mechanical engineering degree.

★ ★ ★

MR. DEVANEY will be succeeded by **Alonzo C. Keller** who has been appointed assistant general superintendent. Mr. Keller started to work at Aliquippa in 1925 in the metallurgical department. He has been superintendent of the open hearth and Bessemer department since January 1, 1948.

★ ★ ★

HE was graduated from Penn State College with a Bachelor of Science Degree in Chemistry.

★ ★ ★

Johnson Steel & Wire Company Appointments

JOHNSON STEEL & WIRE CO., Worcester, Mass., elected **Joseph F. Timmerman, Jr.,** vice president in charge of sales. He formerly was assistant manager of sales, Detroit district, Detroit Steel Corp., and had previous association with Portsmouth Steel Co., and Keystone Steel & Wire Co. **Robert E. Lauterbach** resigned as treasurer to accept a position as assistant to the treasurer and to the secretary, Pittsburgh Steel Co., parent company of Johnson Steel & Wire. **Gerald R. McClure** was named to succeed Mr. Lauterbach, and **James S. Howard** was elected assistant treasurer, succeeding Mr. McClure in that office.

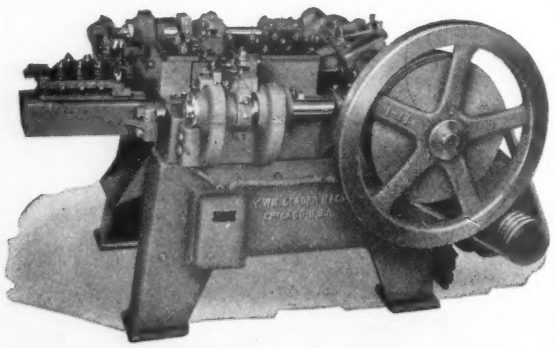
★ ★ ★

Morse Chain Company Appointments

APPOINTMENT of **J. Nall Candler** as administrative assistant to the president and general manager is announced by **Morse Chain Co.,** division of Borg-Warner Corp., Detroit. Mr. Candler formerly was assistant general manager of B-W's Norge Division. **Robert N. Black** has been appointed supply manager of Borg-Warner International Corp.

★ ★ ★

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 No. Racine Ave.
Chicago 7, Illinois
Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Roebling Names Spofford to New Position

ROBERT K. SPOFFORD has been named director of purchases for **John A. Roebling's Sons Company,** Trenton, N. J. The appointment, which became effective on October 30, was announced by Charles R. Tyson, president. In his new position, Mr. Spofford will be in charge of the procurement of materials used in the manufacture of wire rope, electrical wire and cable, woven wire fabrics, cold-rolled steel and related products.

★ ★ ★

FOR the past seven years, Mr. Spofford was associated with The Okonite Company, five of which he served as purchasing agent. Prior to that he was assistant to the supervisor of purchases for the Continental Can Company, Inc. He is a member of the National Association of Purchasing Agents and a graduate of Yale University.

★ ★ ★

Oakite Holds Annual Technical-Sales Meetings

HOW recent developments in the field of cleaning and allied procedures are helping industry meet the demands of increased production was the central theme of a series of technical-sales meetings held in New York, Cleveland, and Hollywood, California, during the month of November by **Oakite Products, Inc.**

★ ★ ★

AS in former years, the meetings were in the nature of a general sales and technical review, embodying round-table discussions on new materials and servicing methods designed to save time and work on a wide range of industrial cleaning and associated tasks. A feature of these meetings were special reports presented by Oakite research chemists, service engineers and technicians on latest trends in cleaning and related practices for nearly every branch of industry. Also discussed were new materials to be made available by the Company during the coming year.

★ ★ ★

CF&I Appointment

VICTOR W. JOHNSON has been placed in charge of COLORADO FUEL & IRON CO.'s rod mill at Pueblo.

★ ★ ★

Copperweld Steel Appoints

CHARLES A. TAYLOR was elected treasurer, **Copperweld Steel Co.,** Glassport, Pa., filling the vacancy caused by the death of **Millard H. Ronzone.** Mr. Taylor became associated with Copperweld in 1939 as assistant controller, and was appointed controller in 1949.

★ ★ ★

Shakeproof, Inc. Appointments

FRED K. KNOHL, formerly in charge of field engineering, has been appointed chief engineer for **Shakeproof, Inc.,** Chicago, **Kenneth C. MacKay,** associated with Shakeproof since 1939 and recently sales analyst and director of the sales training program, has been named budgetary control manager. **Elbert Faust,** formerly production superintendent, has been named assistant works manager. **Henry Archer,** general foreman, has been named to succeed Mr. Faust as production superintendent.

Serving the...

Insulated and Bare Wire Industries All Over The World With ...

Wire Sparkers and Accessories
Electrode Units
Hand Locaters
Automatic Reelers, Coilers, Spoolers and Re-Spoolers
Reel Take-Ups
Collapsible Coiling Reels
Measuring Machines
Pay-Off Reel Stands
Pneumatic Disk Brakes
Pneumatic Cylinders, Valves and Controls
Wire Marking Machines
Wire Labelling Machines
Wire Pre-Heater
Insulation Patching Press
Traverse Mechanisms
Slip Clutch Drives
Retail Wire Dispenser
Hydraulic Cable Cutters
Take-up, Measuring and Pay-Off Equipment for Warehouse Use

(See Page 1040 For News Of A New Type Marking Machine!)

JAMES L. ENTWISTLE CO.
43 Church Street, Pawtucket, Rhode Island, U. S. A.
30 YEARS OF SERVICE TO THE WIRE INDUSTRY
European and South American Agents: M. CASTELLVI, INC. 150 BROADWAY, NEW YORK 7, NEW YORK
British Associate: GENERAL ENGINEERING CO., LTD. BURY ROAD, LANCS., ENGLAND

Hydraulically Operated **TRAVERSE REELS**

FOR FLAT WIRE AND NARROW STRIP

• The self-contained, compact SECO Traverse Reel has smooth, powerful hydraulic operation — at speeds from 150 to 600 feet per minute.

PERFECT SPEED CONTROL from zero to top running speed through flow control.

ACCURATE TENSION CONTROL through pressure regulation.

Built in sizes for coils weighing up to 600 lbs., for round or flat wire. Unit shown occupies floor space 24" x 42". Modifications in design and construction to meet specific requirements.

WIRE SPOOLERS

Single and Multiple Type

Speeds Up To 4,000 feet per minute

STEEL EQUIPMENT CO.

SECO 2890 EAST 83rd STREET
CLEVELAND 4, OHIO

The *SPECIALISTS* in Wire-Straightening and Wire-Cutting!

Diameter Range — 1/16" to .005"

PRECISION - Our Motto

DON'T hesitate to call on us when you are confronted with wire-straightening problems involving close tolerances and absolute accuracy. For seventeen years we have specialized in straightening and cutting all gauges of fine wire, hard or soft, ranging in diameter from one-sixteenth of an inch down to five-thousandths of an inch. We employ gun-barrel accuracy in straightening lengths from one inch to ten feet or any fractional part thereof. Ends cut absolutely clean without burrs.

•

ASK ABOUT OUR UNEXCELLED FACILITIES FOR CLEANING AND POINTING WIRE ALREADY STRAIGHTENED AND CUT.

ALL TYPES OF WIRE...

- Nickel
- Stainless Steel
- Bronze
- Brass
- Copper
- Alloy Wire
- Music Wire
- Tag Wire
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Write us today!

Manufacturers of the famous ARMA PAPER CLIP

PITTSBURGH CUT WIRE COMPANY

1112-20 GALVESTON AVENUE · PITTSBURGH, PENNSYLVANIA.

TELEPHONE: CEdar 4702

A Review of Recent Wire Patents

NO. 2,524,293, TENSION SPRING, patented October 3, 1950, by Ture Lindstrom, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania.

A helical tension spring of wire is patented including a number of generally circular turns constituting the mid-portion of the spring, the continuation of each end turn of the generally circular configuration gradually going over into several inwardly spiralling turns all of which at each end fall generally in the planes normal to the spring axis, and the last half of the innermost spiral turn at each end being bent outwardly to form a hook at each end the bight of which falls substantially in the axis of the spring.

★ ★ ★

NO. 2,524,439, METHOD AND APPARATUS FOR TREATING WIRE PRODUCTS, patented October 3, 1950, by Richard Duane Green, Trenton, N. J., assignor to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey.

Wire strand or rope is treated to increase its ultimate strength by moving the strand or rope longitudinally and subjecting successive short lengths of the moving material to tension that is increased to a maximum and then reduced, the maximum tension being in excess of the proportional limit of the material so that permanent set is imparted to at least a majority of the individual wires in the material.

★ ★ ★

NO. 2,524,480, BOLT ANCHORAGE, patented October 3, 1950, by Tamis C. Schenk, Richmond Hill, N. Y.

This device is constructed of narrow flat metal strip coiled into a spiral.

★ ★ ★

NO. 2,524,536, INSULATED ELECTRICAL CONDUCTORS, patented October 3, 1950, by Birger W. Nordlander, Schenectady, and John A. Loritsch, Scotia, N. Y., assignors to General Electric Company, a corporation of New York.

About the wire center is a permeable insulation impregnated with a solid product of polymerization of a polymerizable compound containing a peroxide catalyst.

★ ★ ★

NO. Design 160,330, WIRE SOAP HOLDER, patented October 3, 1950, by Isidore Morse, Bronx, N. Y.

This design is for a soap holder constructed of wire disposed in loops.

★ ★ ★

NO. Design 160,330, WIRE SOAP HOLDER, patented October 3, 1950, by Isidore Morse, Bronx, N. Y.

Here the wire is disposed angularly.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

REISSUE 23,281, A WIRE STRANDING DEVICE, patented October 10, 1950, by Otho L. Giffin, Worcester, Mass.

A strand package mounted upon a rotatable spindle for rotation therewith and having a number of strands wound thereabout and the assembly further includes, a strand-guiding head including a central hub disposed coaxially of the spindle, the hub being frictionally supported upon the spindle, an even number of strand guide elements circumferentially spaced about the hub, means for rigidly securing one half of the strand guide elements to the hub, and a device for flexibly securing the other half of the strand guide elements to the hub, each of the strands passing successively through one of the flexibly mounted strand guide elements and a respective one of the rigidly mounted strand guide elements.

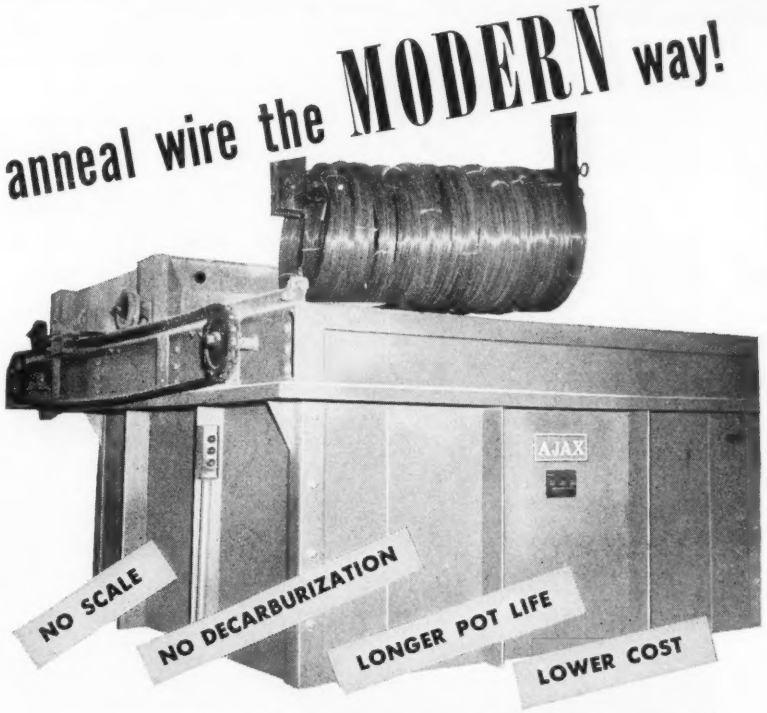
★ ★ ★

NO. 2,524,900, COLLAPSIBLE WIRE BASKET, patented October 10, 1950 by George Einhorn, Forest Hills, N. Y., Fannie Einhorn administratrix of said George Einhorn, deceased.

The basket is made up almost wholly of wire.

★ ★ ★

NO. 2,525,230, WIRE ROPE MAKING MACHINE, patented October 10,



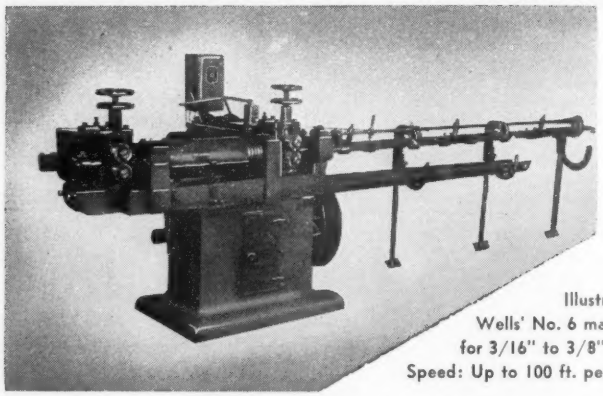
You'll save money, you'll improve efficiency along many lines with the unique Ajax Electric Salt Bath wire annealing method. It requires less floor space, less labor, less maintenance. Heating cycles average less than 20 minutes, even on difficult jobs. There is no scaling, no decarburization, no explosion hazard, none of the bothersome problems entailed with atmosphere equipment. Salt bath treating does the work faster, better, cheaper!

Ideal for annealing low- or high-carbon and stainless steel wire and rod; annealing aluminum, and copper and silver alloys; and for descaling stainless and alloy steel wire in molten salt baths.

AJAX ELECTRIC COMPANY, INC.
Frankford and Delaware Aves. · Phila. 23, Pa.
The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively

WRITE FOR YOUR COPY!
This 72-page Ajax booklet tells the entire story of salt bath heat treatment as applied throughout modern industry. Ask for Booklet 116.

Wells' STRAIGHTENING and CUTTING MACHINES



Illustrated:
Wells' No. 6 machine
for 3/16" to 3/8" wire.
Speed: Up to 100 ft. per min.

Other WELLS' machines will handle wire from 1/16" to 5/8 diameter: Precision made of finest steels, all WELLS' machines are rugged, dependable and low in cost, built to long, continuous service. They are the result of 57 years of cumulative experience and may be bought with confidence of satisfactory performance.

WELLS employs no salesmen or agents. All inquiries and orders handled courteously and efficiently by the Home Office at Kenosha, Wisconsin.

Send for Catalog No. 50 describing these and other WELLS' wire working machines. Please address inquiries to:

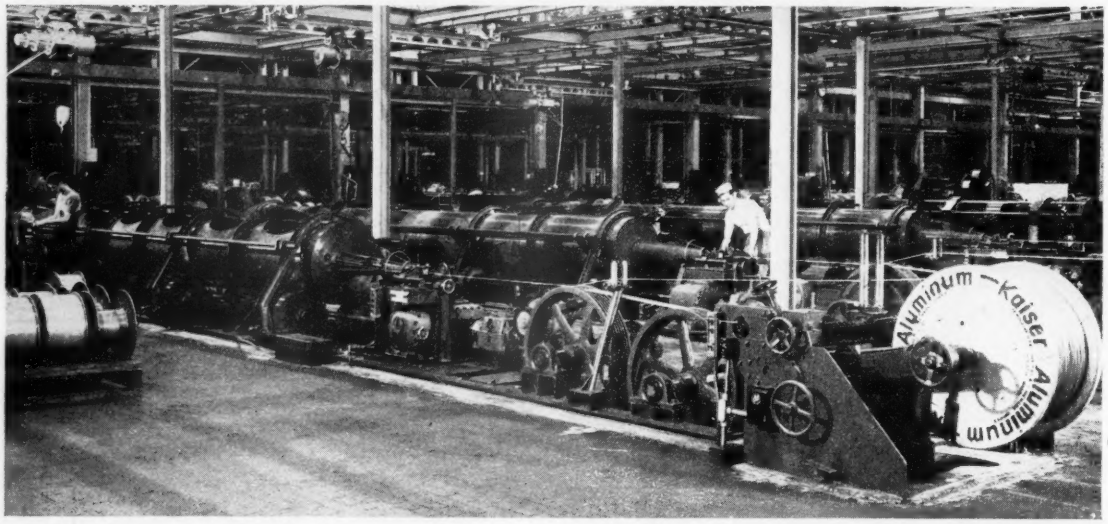
Frank L. Wells Company

5821 FIFTH AVENUE — KENOSHA, WISCONSIN

Builders of Wire Working Machinery

NEW 22" SPOOL 750 RPM TUBULAR STRANDER

HYDRAULIC LIFT REEL STAND—INFINITELY VARIABLE TRAVERSE AIR CONTROLLED
DOUBLE DRUM HAUL-OFF WITH LINK BELT P.I.V.—AIR OPERATED BRAKING SYSTEM



HMT — ESTABLISHED 1846 — HUGHESVILLE MACHINE & TOOL COMPANY — WIRE & PROCESS MACHINERY

Hi-Efficiency

HUGHESVILLE MACHINE & TOOL CO.
54 ACADEMY STREET
HUGHESVILLE, PA.
Phone: 129-A

1950 by William T. MacCreadie, Lewisburg, Pa.

The machine includes a rotating outer frame, a stationary frame within the outer frame, bobbins in carriages rotatably mounted within the stationary frame, a drum and a die supported for rotation in the axis of the outer frame and adapted to receive wires from the bobbins, a device to lead the strand from the drum laterally of the outer frame and in a reverse direction therein and back into the axis, and a wind-up drum to receive the strand.

★ ★ ★

NO. 2,525,254, COIL OPENING APPARATUS, patented October 10, 1950 by Philip P. Appleby, Maryville, Tenn., assignor to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania.

More specifically, this is a coil unwinding machine. There are 8 claims.

★ ★ ★

NO. 2,525,285, CONTINUOUS METHOD AND APPARATUS FOR MAKING COILED STRUCTURES, patented October 10, 1950 by Ralph D. Collins, Beverly Hills, Calif., assignor, by mesne assignments, of one-half to The Whitney Blake Company, Hamden, Conn.

Included are four planetary rollers, successively right-angularly arranged about the axis of a rotary member mounted on a stationary block, and being grooved to conform accurately to the overall diameter of the coiled wire passing therethrough.

★ ★ ★

NO. 2,526,010, STRIP COILING APPARATUS, patented October 17, 1950 by Eric H. Edstrom, Pittsburgh, Pa., assignor to United Engineering & Foundry Company, Pittsburgh, Pa., a corporation of Pennsylvania.

Strip material is coiled and wrapped by this apparatus. There are 13 claims.

★ ★ ★

NO. 2,526,147, WIRE ROPE MAKING MACHINE, patented October 17, 1950 by William T. MacCreadie, Lewisburg, Pa.

The machine includes a second frame mounted coaxially within a main frame, a third frame mounted coaxially within the second frame, a device for rotating the main and second frames in opposite directions and for maintaining the third frame stationary, supply bobbin frames and a twister die and haul-off frame all mounted for rotation in the third frame, bobbins rotatably supported in the bobbin frames, and a device for rotating the twister die and the haul-off frame in the same direction as the second frame.

★ ★ ★

NO. 2,526,237, ADJUSTABLE MOUNTING FOR WIRE DRAWING DIES, patented October 17, 1950 by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Massachusetts.

Here the assembly comprises a slide vertically movable with respect to a frame, a bracket mounted on the slide and turnable about a horizontal pivot extending through the slide, with this bracket providing a portion projecting beyond and parallel to the axis of its pivot, and a die holder mounted on the projecting portion and turnable about a pivot extending vertically through the bracket portion and intersecting the pivotal axis of the bracket with the die holder providing a circular opening for a die, and with the central axis of the die-receiving opening passing through the intersection of the pivotal axes of the bracket and the holder.

★ ★ ★

NO. 2,526,247, METHOD AND APPARATUS FOR PRODUCING WIRE STRAND OR ROPE, patented October 17, 1950 by Dartrey Lewis, Trenton, N. J., assignor to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey.

Twisting means is provided and arranged to receive the rotating strand or rope directly from a rotary twisting head and thereby remove a controlled amount of twist from the overtwisted strand or rope.

★ ★ ★

NO. 2,526,731, METHOD OF AND APPARATUS FOR COATING METALLIC STRANDS WITH A METAL COATING, patented October 24, 1950 by Kenneth G. Coburn, Middletown, Ohio, assignor to Armco Steel Corporation, a corporation of Ohio.

After the strands leave the bath, they move upwardly through an elongated hood and through a gas which is ignited at the lower and upper ends of the hood.

★ ★ ★

OUR ADVERTISERS — Your most dependable sources of supply. You can buy from an advertiser with confidence—he has a reputation to sustain. Read the ads and keep abreast of what the suppliers have for you.

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.

5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

Story of the Convention

(*Continued from page 1059*)

Point. As your name is called you will please come forward.

For 1941—Kenneth B. Lewis
For 1942—Louis H. Winkler
For 1944—Arthur M. Reeder
For 1947—F. Titus Updike
For 1948—Clement L. McGowan
For 1949—Allan B. Dove

There are five others who are not here and their certificates will be delivered to them.

★ ★ ★

"THE Mordica Lecturer selected for 1950 needs no introduction to most of us. He was born in Detroit, Michigan; attended high school at Bradley Polytechnic Institute; and was graduated from the University of Illinois in 1911, at which time he was employed by Keystone Steel & Wire Company, Peoria, Illinois. First, he served as Chief Chemist and Metallurgist for 9 years until 1920; then, as Efficiency Engineer until 1923; and then, as Open Hearth Superintendent, until 1927. He then became associated with Continental Steel Corporation, Kokomo, Indiana, as Chief Metallurgist from 1927 until 1934; then as Superintendent, Steel and Wire Division until 1938, since which time he has served as General Superintendent.

★ ★ ★

"HE is well known for his many inventions in the fields of protective metallic coating, open hearth furnaces and practice, and in wire processing. Again, The Wire Association not only honors a man for what he has done and what he IS, but honors itself.

★ ★ ★

"I PRESENT **Julian F. Schueler,** who will deliver the 1950 Mordica Memorial Lecture."

★ ★ ★

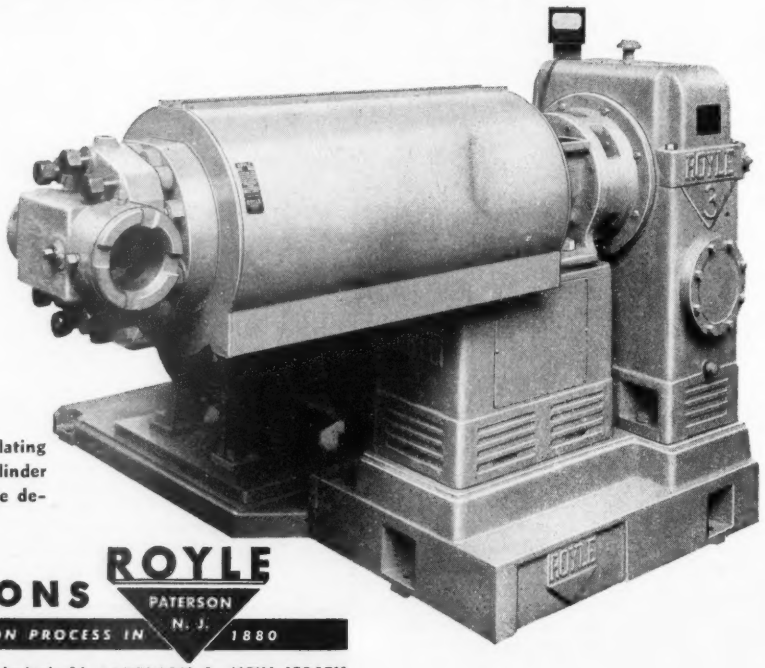
MR. Schueler's lecture, which will be the feature article in January, was entitled the "Design and Manufacture of Woven Wire Fence." Supported by illustrations, the talk gave a most comprehensive picture of history, types and problems connected with his subject. Mr. Schueler is to be congratulated on his splendid and interesting presentation.

★ ★ ★

FOLLOWING the luncheon the Annual Meeting of the Members of the Wire Association was called to order by Mr. Crapo, who presided. The minutes of the previous meeting were read by the Executive Secretary, Mr. Brown, and approved. It was announced that at the Board Meeting on Monday, **Sidney Rolle,** of the Scomet Company, had been selected to give the Mordica Memorial Lecture in 1951. Other announcements included the designation of three regional meetings for next Spring—in **Hamilton, Ontario,** in April, for which **James B. Galloway** of the B. Greening Company will serve as Chairman; in **Atlanta, Georgia,** in May with **Clement L. McGowan** of Atlantic Steel Company as Chairman; and in **Los Angeles** in May, the Chair-

ROYLE *for WIRE INSULATING*

- **Continuous Vulcanizing Machines for Rubber Wire Insulation**
- **Plastic Wire Insulation Machines**
- **Strainers • Cooling Troughs**
- **Light Wire & Cable Capstans**
- **Motorized Take-Ups**
- **Temperature Control Units for Extrusion Processes and other industrial uses**



ROYLE # 3 Plastic Wire Insulating Machine. Double extended cylinder enclosed in insulating jacket, side delivery head.

JOHN ROYLE & SONS ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — REgent 2430
Home Office — J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — JEfferson 3264
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

man for which has not been appointed. **Ralph B. Roth** of Ludlow Saylor Wire Company will serve as General Chairman of the Program Committee for the 1951 Annual Convention in November in Chicago. A resolution expressing our debt of gratitude to **LeRoy D. Seymour,** Marshall Richards Machine Company, Inc., for being responsible for the Association's By-Law revisions, was placed on the record and a vote of thanks to **Carl E. Johnson** was proposed and seconded for his splendid work as Chairman of the 1950 Program Committee. Other business included an invitation to **S. H. Richards,** Technical Director of the Marshall Richards Machine Company, Ltd., England, to wind the clock presented to the Wire Association by our British members two years ago.

★ ★ ★

IN the evening the annual Stag Smoker-Dinner was held in the Ball Room. The entire event was smoothly run by the hotel management and the affair was filled with conviviality and good-fellowship. The show following the dinner was, from general comments heard about the hotel later on, somewhat disappointing and not up to our usual standards. Suffice it to say that the whole occasion in general was most successful.

★ ★ ★

Thursday, October 26th

THIS last day was wholly devoted to the plant visitation of the Sparrows Point Rod and Wire Mills of the Bethlehem Steel Company. Busses left the hotel at 10:30 A.M. for the docks on the Northwest Branch of the Patapsco River, where nearly 500 members and guests, including the ladies who had come to the Convention, boarded the Steamer Latrobe. From here the steamer went down the river, up around the Middle Branch, into Curtis Bay and then down the Lower Patapsco Branch to Sparrows Point. Enroute the group was entertained with music and running comments on what we were seeing by Morton M. Prentice, Jr., of the Baltimore Chamber of Commerce, and by Carl Johnson, our host. Before arriving at the plant a delicious luncheon was served through the courtesy of the Bethlehem Steel Company.

★ ★ ★

THOSE who had not been to the Sparrows Point plant in recent years were amazed at the changes effected in the Rod and Wire Mills in the past few years. Much new equipment had been added and considerable expansion was evident. The guests saw everything in wire-making from rod-rolling to the manufacture of nails and barb wire. The day was perfect and the mills a model of efficiency, good equipment and work-flow layout. High praise and satisfaction were heard on every side for the delightful and instructive events of the day. This trip concluded the Convention activities.

★ ★ ★

A DESCRIPTION of the Convention would not be complete without reference to the presence of the ladies and the plans made for their entertainment. Each one who had come was provided on the first day with an envelope containing information on what she could

Only HYPREZ can do a Hyprez Job!

IN FINISHING WIRE DIES AND TOOLS

A Difficult Die Hyprez Finished To Perfection

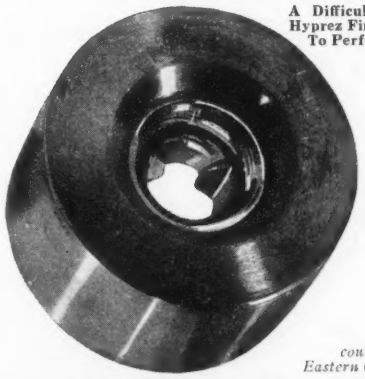


Photo courtesy of Eastern Carbide Corp., New Rochelle, N. Y.

- HYPREZ DIAMOND COMPOUNDS are formulated of precision-graded, fast-cutting, virgin diamond particles.
- HYPREZ diamond particles are permanently suspended and uniformly distributed in a base of different color for each grade.
- HYPREZ will "stick to the job" and remain stable and uniform at all normal temperatures.
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- HYPREZ offers 26 engineered standards precisely graded for a complete and perfect job—from rough finish to mirror polish.

For this technique folder or for a free demonstration write to Dept. W-1250.

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AN EXCLUSIVE PRODUCT OF

HYPREZ DIVISION

ENGIS EQUIPMENT CO., 431 S. DEARBORN ST. CHICAGO

do and see in Baltimore, and with a list of the special entertainment provided for her. Among these was a trip on Tuesday to Annapolis as the guests of **Mrs. Carl E. Johnson** and **Mrs. Leonard C. Crewe,** which included luncheon at Carvel Hall, a tour through the Naval Academy, and tea at the Governor's Mansion. On Wednesday **Mrs. Charles P. Orr** and **Mrs. Walter Smigel** entertained the ladies for cocktails and dinner at the Park Plaza Hotel. The ladies, as previously mentioned, also attended the Annual Luncheon on Wednesday and enjoyed the boat ride to and the trip through Bethlehem's Sparrows Point Rod and Wire Mills.

★ ★ ★

WE would be remiss if we did not comment upon the attentive and efficient work on the part of the Lord Baltimore's management, particularly the constant vigilance of **Messrs. Bliss** and **Miller,** through whose efforts the hotel's part in the success of our Convention was kept functioning with flawless smoothness.

★ ★ ★

BUT, of course, no Convention can be a success without teamwork, and this year, to Carl Johnson, to the committee members and to those who contributed such fine technical papers so willingly and well, the Wire Association is deeply grateful.

★ ★ ★

G.E. Appoints Manager of Silicone Plant

JOHN T. CASTLES has been appointed manager of the **General Electric Chemical Department's** silicone plant at Waterford, New York, it was announced by William L. Rodich, manufacturing manager for the Chemicals Division.

★ ★ ★

MR. CASTLES, who holds a master of science degree from the Massachusetts Institute of Technology, has been with the Company since 1947.

Cleaning and Coating Symposium

Lubricant Coatings on Wire for Bolt and Rivet Manufacture

(*Continued from page* 1046)

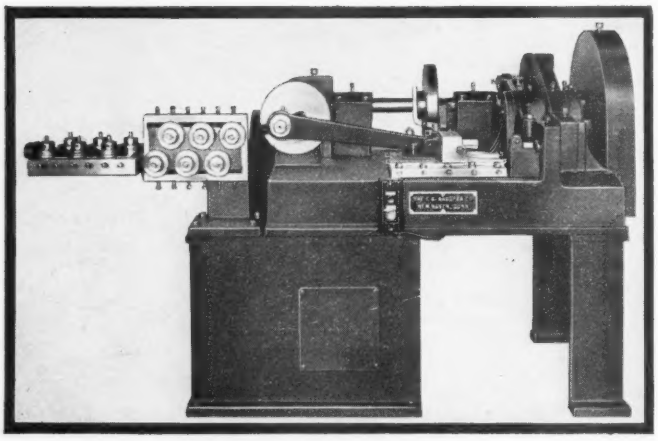
3. The drawn wire inventory necessary to operate bolt headers efficiently would be reduced by approximately 40%.

   This would be possible because it is now necessary to carry the same size and grade of wire in stock—but with two or three different finishes. By using only one finish, more floor space would be available. Also, wire spoilage due to material not moving fast enough would be eliminated.

4. There would be less machine down-time due to material waits, if the wire were interchangeable.

SHUSTER AUTOMATIC SLIDE FEED MACHINE

Straighten and Cut Round or Shaped Stock—Short Lengths



Production, 125 pieces per minute

HIGH PRODUCTION
HIGH PRECISION

Recommended wherever accuracy and a perfectly square cut are a "must." In this machine, the stock receives a shearing cut from two round dies. This method of cutting produces an accurately square cut and holds the length of cut to very close tolerances.

Capacities: 3/8" and 9/16" diameters; lengths from 0 to 10"; production, 125 pieces per minute. May be had without the 12-roll straightener if your stock is already straightened.

Detailed circulars on request. When writing please describe your set-up.

Mfd. by METTLER MACHINE TOOL, INC., 132 W. Lawrence St., New Haven, Conn.

SHUSTER *Automatic* — *Since 1866* — WIRE STRAIGHTENING AND CUTTING MACHINES

5. Intangible factors would be, less motor and machine maintenance because of a cleaner

Figure 1.

mill. No dust from conventional die box lubricants could accumulate as it does now at the draw blocks.

★ ★ ★

WHAT Do We Expect From Lubricant Coatings? We have placed our goal high and expect the following:

1. A finish which will extrude or double extrude on solid die machines.
2. A finish which will not slip on open die machines.
3. A finish which will allow swaging without slippage.

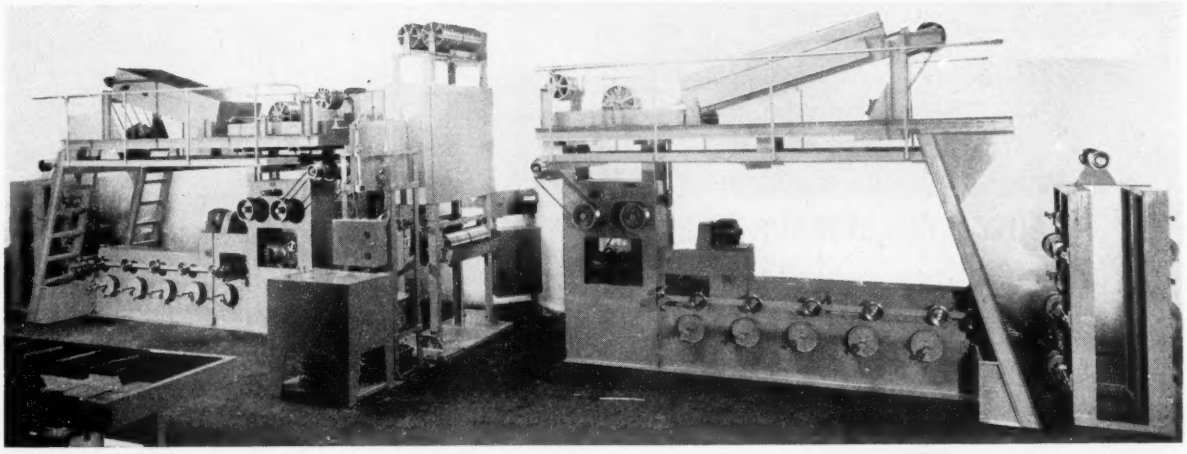
Figure 2.

4. A finish which will consistently drive down into a cone or dog point.
5. A finish which will not "load up" knock-out pins, dies or the mechanisms of the machines.
6. One which will not "muck up" when in contact with any oil prior to upsetting.
7. One which will not break down due to higher temperatures created by cold heading at higher speeds.
8. The finish must not "load up" squares, shoulders or keys in dies, and produce a poor quality product.
9. The finish must not be hygroscopic and must not deteriorate with age.
10. It must give good die life and above all, must enable a quality product to be produced at a nominal cost.

★ ★ ★

WHAT We Have Seen With Lubricant Coatings:

1. A finish was produced on wire which was interchangeable on all types of cold heading equipment.
2. This finished wire was used on machines upsetting 1/8" to 3/4" diameter bolts. Capacity ranges of the machines varied from 3,000 to 31,000 pieces per hour.
3. A finish was produced which would not "flake off" during



DOUBLE SIDE WIRE ENAMELING MACHINE, No. 997, with Electric Heated Oven, height shortened for photograph. Oven also supplied gas heated.

Complete with Electric Heated Pre-Annealers, Enamel Storage, Circulating and Filtering System.

EST. 1855 AIMco INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

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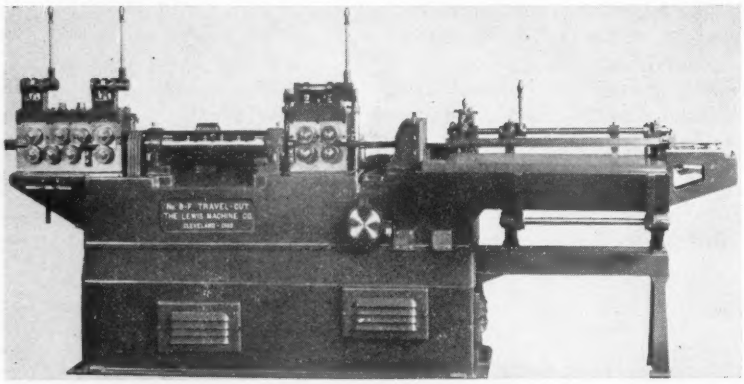
upsetting, and which would not load up either the tools or the mechanisms of the machines.

4. Some of the many types of products cold headed were Machine, Carriage, Plow, and Bumper Bolts; Machine, Self Tapping and Cap Screws, and all types of Recessed Heads.
5. Rods, varying only a few thousandths in diameter, were cleaned, dipped, **not drawn** and run directly into bolts on the boltmaker.
6. Although not a recommended practice, some exceptionally scaly wire was processed. This wire normally would plug solid dies, causing a smashup. However, approximately 1200 pounds of scaly wire ran with no difficulty. The scale condition on the rivet is shown on the accompanying photograph. See page 1075.
7. Another abnormal condition observed with finishes produced by lubricant coatings is shown in photograph #2. The rivet on the right was scratched in the die. The die was galled by a defective blank. The die ordinarily would plug from this condition. However, within 5 minutes, the die cleaned up and was producing rivets as shown by the other rivet in the photograph. We intentionally did this several other times and had the same results. However, this is no guarantee that this condition will always persist.
8. As users of wire well know, wire that is subjected to humidity and temperature changes for a period of time will rust or the coatings will deteriorate. When this occurs, we are unable to "kick-out" the upset blank from the die. Obviously, much difficulty arises. We have reclaimed wire such as this by dipping it into the lubricant coating and using it satisfactorily directly on the cold heading machines. Redrawing and/or scrap was eliminated.
9. We have noted that the metal on the fillets or radii under the heads of bolts and rivets have a good coating. Likewise, on small driven points (40° or 60° angles included), the metal on the angle of the point still has a good coating. Naturally, this coating prevents metal-to-metal contact and gives greater die and punch life.
10. This statement is not made to promote an argument between wire mill men and bolt manufacturers. However, it appears that driving points for Type A Tapping Screws and extrusions during heading are more difficult to do with plain carbon wire than multiple drafting. Only the driven point on Type A Tapping Screws (that is, the point formed in the die during cold heading) will be discussed here.

    A Cone point (30° included angle) or a Dog Point (30° angle and then straight por-

CUT YOUR CUTTING COST WITH

LEWIS TRAVEL-CUT



Wire Straightening & Cutting Machines

The simplicity of design and rigid construction of the Lewis Travel-Cut makes it well suited for the most severe high-production requirements. This machine feeds the wire from the coil, straightens, gauges to accurate length, and cuts while in motion thus producing uniform diameter rod free of arbor swell and feed roll marks. It is particularly adapted to precision work on bright finished steel, brass, aluminum, stainless, and alloy wire. This method of cutting is also very efficient for short lengths such as welding rod, special bolts, etc., and increases the over-all efficiency approximately 20% over the conventional type of cut-off.

Machines built in various sizes to handle from 1/16" up to 3/4" diameter, and 1/16" to 5/8" square or equivalent area in hexagon and flat.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 1017 Helmsdale Rd., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix, Ltd., Devonshire House, Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company
3441 E. 76th Street, Cleveland 4, Ohio

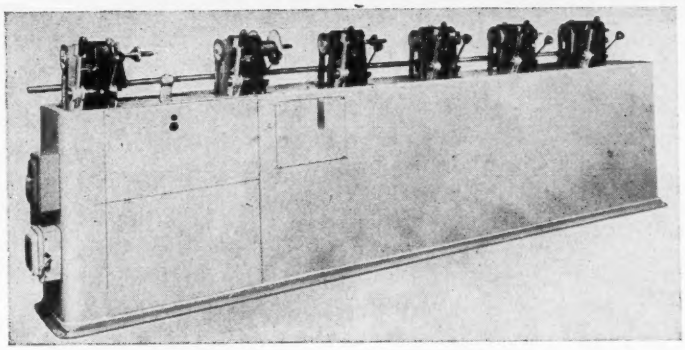
—o—

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

tion) is required. This, when threaded, gives a Type A Tapping Screw—similar to the gimlet point of a Lag Bolt. Tolerances are very close. For instance, with an 8-15 x 1¼" screw, the blank diameter tolerance is .131-133". The length tolerance under the head is plus or minus .004". However, if the length of the point varies, the point after threading will either be blunt or will burn off, neither of which is characteristic of a quality Tapping Screw.

With conventional coatings, often many variations in length of points occur, even with the same coil of wire. Therefore, many Tapping Screws are often produced with points of poor quality.

We have been able to successfully point most all Tapping Screws with uniformity by using wire drawn with lubricant coatings. In some cases, we have been able to drive-



NO. 1900K MULTIPLE SPINDLE SPOOLER

This spooler is outstanding for its many unusual and desirable features.

Takes spools up to 16" flange diameter. Enclosed type, with mechanism readily accessible from rear side. Spindles mounted on ball bearings and each may be stopped or started individually. Uses Worthington All-Speed Drive unit.

All Emory Spoolers supplied standard or equipped to meet customers' special specifications.

On Spooling problems, consult

ROBERT J. EMORY COMPANY

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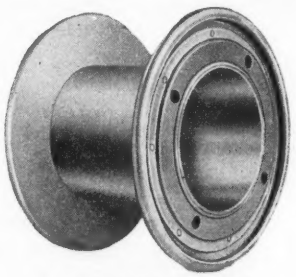
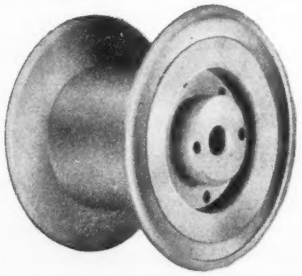


FINE WIRE HIGH SPEED WIRE DRAWING SPOOLS



James Day (Machinery) Ltd.,
90 Regent Street
London W.I, England

MOSSBERG **PRESSED STEEL** CORP.

A complete line of HEAVY DUTY PRECISION SPOOLS and REELS especially designed for high speed wire drawing and annealing.

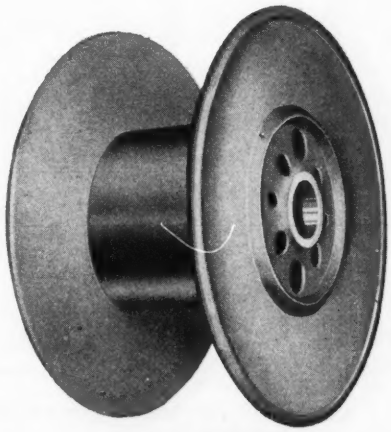
The degree of efficiency obtained by the HIGH SPEED WIRE DRAWING MACHINE is largely dependent upon the accuracy and durability of the take-up spool.

The use of our PRECISION SPOOLS will increase your machine efficiency and eliminate your spool difficulties.

Complete range of sizes.

MOSSBERG PRESSED STEEL CORP.

18 West Street,
ATTLEBORO, MASSACHUSETTS, U. S. A.



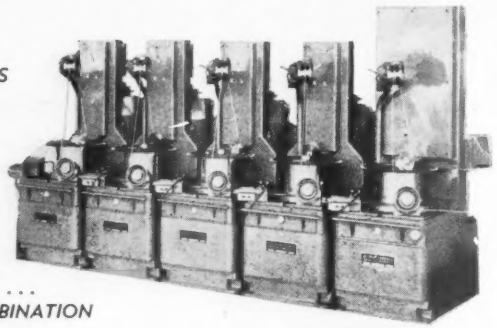
COMBINATION
500 lb. CAPACITY WIRE DRAWING—ANNEALING — STRANDING — REEL.

AETNA-STANDARD WIRE DRAWING UNIT

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

FERROUS OR NON-FERROUS

WET OR DRY LUBRICANTS

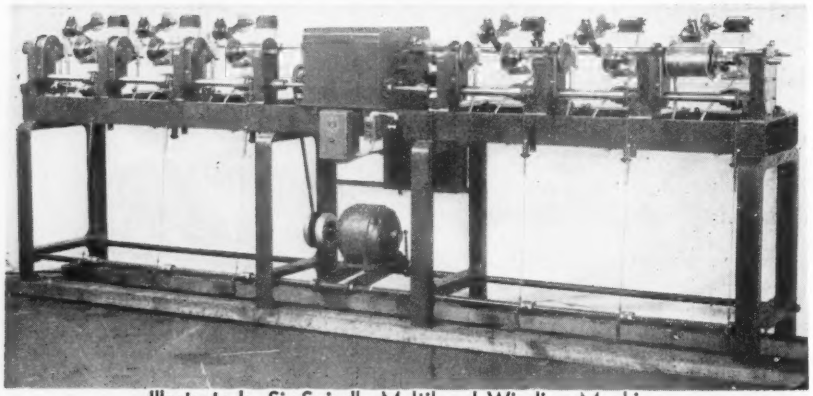


SINGLE UNIT ... OR ANY COMBINATION

THE AETNA-STANDARD ENGINEERING CO.
YOUNGSTOWN, OHIO

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND
AETNA-STANDARD ENGINEERING COMPANY, LTD. . . . . TORONTO, ONTARIO, CANADA

MACHINERY FOR WIRE
WINDING · SPOOLING · COILING



Illustrated: Six-Spindle Multihead Winding Machine

The Winder shown above has a main control box with a single screw reversed by a solenoid control for traverse of wire guides. Each head individually controlled by a pre-determined measuring device.

Send for information on this winder and our complete line of BOYD-FIDELITY SPOOLERS

BOYD & SONS MANUFACTURING CORPORATION
1434-38 Callowhill St., Philadelphia 30, Pa.

point screws which we previously were unable to do.

11. Another factor has been the elimination of oil on the wire for some types of cold heading.

★ ★ ★

WE firmly believe that lubricant coatings will be perfected 100% in the very near future. We know what has been done with the finishes produced. To us, it can be more satisfactory than the other conventional adopted finishes.

★ ★ ★

SINCE this report was written, an additional 500 tons of Wire with the Universal Coating have been produced. Very good results have been obtained.

The greater part of the 500 tons has been used on four machines representing the various types of processing. The four types are as follows:

1. 5/16″ Rivets on a Fast Speed, Single Stroke Solid Die Header.
2. A 5/8″ Cut Thread Machine bolt on a 5/8″ Double Stroke Open Die Header and on a Swaging Machine.
3. Cap Screws on a 5/16″ Boltmaker.
4. Various Items on a 3/8″ Double Stroke Solid Die National Header.

In appearance, this universal coating was very similar to the boltmaker finish. However, it was used interchangeably on both the boltmaker and the soap finish applications. In addition, **the lubricant solution was very easily controlled.**

An additional factor brought forth by this past period is as follows: of late, the quality of steel has not always been up to par. Therefore, many times after wire is drawn it must be diverted to another end product due to the wire quality. It is not always possible to do this with conventional coatings. However, with the **universal coating,** it was possible to divert, with no extra cost and with no ill effect.

★ ★ ★

EFFICIENT PICKLING WITH
Rodine®
PICKLING ACID INHIBITORS
SAVES ACID
SAVES STEEL
SAVES MONEY

Use "RODINE" for improved pickling and increased production!

"RODINE" meets Government Specification No. U.S.N. 51-I-2.

STANDARD PICKLING PRACTICE THE WORLD AROUND
CHEMICALS
ACP
PROCESSES

For Improved Drawing and Cold Forming . . .

"Granodraw" forms on pickled surfaces a tightly bound adherent, zinc-iron phosphate coating which facilitates the cold extrusion of steel, improves drawing, and lengthens die life.

"Cuprodine" coats both carbon and stainless steels with a thin, bright, adherent layer of copper. This coating prolongs die life and improves the drawing of wire, rod and tubing.

Write for Descriptive Folder

American Chemical Paint Co.
AMBLER ACP PENNA.

Sulphuric Acid Cleaning and Coating of Rod & Wire in A Straightline Operation

(*Continued from page* 1048)

acid tanks. Normal time for one round trip of the acid crane through its cycle is 3 minutes. Because of the constant mix of sizes passing through the unit, the time in acid for any one load is controlled by the number of pins in the acid tanks. In order to maintain proper time, a total of 3 to 8 pins will be in acid. The length of time in acid for the various types cleaned is:

Raw Rod —	25- 30 minutes
Air Patented Rod —	12- 18 minutes
Lead Patented Rod —	9- 15 minutes
Air Patented Wire —	12- 15 minutes
Lead Patented Wire —	9- 15 minutes

★ ★ ★

THE lower time value for any one group is the aimed-for time while the higher value is the maximum time which may be incurred.

★ ★ ★

AFTER rinsing and pressure spray washing, the acid crane delivers the load to either the sull rack, the borax tank, or the lime tank depending on the type of coating specified. At this point the coating crane will take over to complete the operation.

★ ★ ★

FOUR types of coatings are applied depending on wire mill requirements:

1. Sull and Borax
2. Borax
3. Lime
4. Copper

★ ★ ★

WHEN sull and borax is applied, the coating operation starts on the sull rack. The rod or wire is submitted to a spray of water for approximately 9- 15 minutes. Next, the load is transferred to the drip rack for the same period of time. At the drip rack, a blast of warm air is shot through the load to promote the sulling action. From the drip rack the material is moved to the borax

Product of MODERN SCIENCE and MASTER CRAFTSMANSHIP

PHILIPS
Master-Made
DIAMOND DIES

● The tools of modern science are combined with the skills of the master craftsman in the production of PHILIPS *master-made* Diamond Dies.

Every diamond selected for cutting is examined by PHILIPS X-ray diffraction apparatus to determine the proper direction for drilling to provide longer life and greater satisfaction to the user. Master craftsmen of long experience, working under the most modern conditions, drill each diamond to precision tolerances. Result? The finest diamond dies obtainable—now available to American industry under the trade name of NORELCO Diamond Dies.

All sizes . . . from .000275 to .100 are available at competitive prices. Let us consult with you concerning your requirements.

Norelco

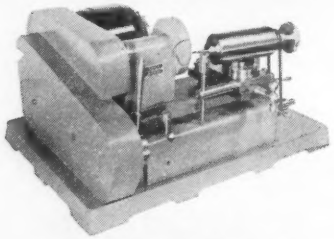
NORTH AMERICAN PHILIPS COMPANY, INC.
Dept. FE-12, 100 East 42nd St., New York 17, N.Y.

ROOS DYKREX

MACHINE CORRECTS AND REJUVENATES YOUR

DIES

to original condition



IT'S MORE than a POLISHER

IT'S MORE than a LAPPER or RIPPER

It corrects the die by straightening out any eccentric entrance angles on the dies.

ROOS TOOL & Mfg. Co.

33-35 BLOOMFIELD AVENUE
NEWARK 4, N. J.

Distributed by

Eastern Carbide Corp., New Rochelle, N. Y.

Carboloy Co. — Detroit — Pittsburgh — Newark—and all Principal Cities.

In Canada — Canadian General Electric Co., Toronto, Canada

tank, given a single dip and then placed in the bakers.

★ ★ ★

FOR straight borax coating, the acid crane delivers the material directly into the borax tank where it is picked up by the coating

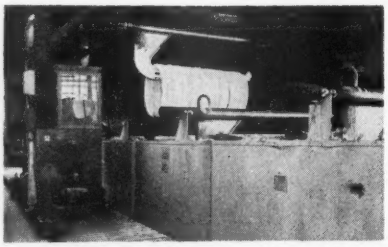


Fig. 4.—Coating Crane with a lime coated load over the bakers.

crane and delivered to the bakers.

★ ★ ★

WHEN lime coating, the acid crane delivers its load directly into the lime tank. The coating crane lifts the load, air dries, rolls, dips again, and transports to the drip rack. After resting on the drip rack for the proper interval of time, the load is again dipped in lime and then taken to the bakers. Figure 4 shows the coating crane with a limed load over the bakers.

★ ★ ★

BECAUSE of the location of the copper coating tank, this operation must be performed by the acid crane following acid cleaning. The coated wire or rod is delivered to the acid rinse tank where the coating crane picks up, dips in borax, and delivers to the bakers.

★ ★ ★

AVERAGE time in the bakers for sull and borax coats and for borax coats is 15 minutes. Lime coats average 20 minutes and copper coats 5 minutes. The relatively shorter time for copper coats is necessary in order to prevent discoloration of the copper which would result if the load were allowed to come up to full baking temperature.

★ ★ ★

ALL material out of the bakers is placed on the unloading

YOUR LACQUER PROBLEMS
GET SPECIALIZED ATTENTION
AT NEW ENGLAND LACQUER CO.
SPECIALISTS IN PRODUCING LACQUER FOR THE Wire Industry

Manufacturers of

PRIMARY WIRE!

NEW, IMPROVED LACQUER IS NOW AVAILABLE

1. RESISTS EXTREME HEAT!
   New England Lacquer for primary wire has resisted 300° F. heat for 8 hours!
2. WITHSTANDS ULTRA-VIOLET EXPOSURE!
3. RETAINS FLEXIBILITY AND GLOSS EVEN AFTER HIGH HEAT!
4. MEETS S.A.E. LOW-TENSION SPECIFICATIONS!

Write today for further information about this outstanding lacquer development.

NEW ENGLAND LACQUER CO.

KING PHILIP ROAD
EAST PROVIDENCE, R. I.

STANNOCHLOR

an outstanding

chemical

STANNOCHLOR— anhydrous stannous chloride — assures improved immersion tinning; better, more uniform results for a score or more of other applications.

This oustanding chemical product, developed by M & T, is efficient and economical to use. It is highly stable and does not deteriorate with age. It contains no water of crystallization — so goes further per pound.

Investigate Stannochlor — or, if tin in any form has a place in your manufacturing or processing, come to headquarters. We'll be glad to discuss your problems.

METAL & THERMIT CORPORATION
100 EAST 42nd STREET,
NEW YORK 17, N. Y.

Specialists in Tin

rack where it is picked up by boom trucks. When the boom trucks lift a load, the identification slip corresponding to the cleaning pin number is taken out of the rack and placed on the load which is then delivered to the proper destination.

★ ★ ★

THE straightline cleaning and coating unit will handle an average of 850,000 pounds of rod and wire in 24 hours with minimums and maximums ranging from 750,000 pounds to 950,000 pounds. Raw acid consumption varies from 29 pounds to 40 pounds per ton of material cleaned with the average being 34 pounds.

★ ★ ★

WIRE sizes smaller than those cleaned in the straightline unit are handled in another unit which is comprised of individual circle layouts designed to handle smaller loads per pin. With the exception of lime coats, the circle unit applies the same coatings as the straightline and in addition, applies straw coats and white coats.

★ ★ ★

THE greatest amount of the material cleaned in the straightline unit is consumed in our No. 1 Wire Mill which draws finished or ripped wire down to size .054″ diameter. Sizes below .054″ diameter are drawn in our No. 2 Wire Mill.

★ ★ ★

IN general, the various types of coatings applied are used as follows:

Sull and Borax Coat

1. Normal and heavy dry drafting of finished and ripped wire down to .054″ diameter except finished spring wire.

2. Heavy dry drafting of finished and ripped wire below size .054″ diameter.

Borax Coat

1. Light dry drafting of heavy sizes (1 or 2 hole work).

2. Normal dry drafting of finished and ripped wire below .054″ diameter.

Lime Coat

1. All finished spring wire down to .054″ diameter.

2. Wire requiring lime coat by specification.

YOU CAN BUNCH

small diameter

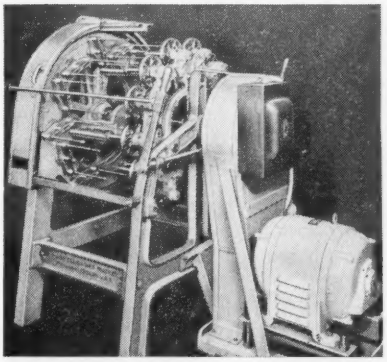
WIRES

on the SINGLE-TWIST PRINCIPLE — Assuring

PERFECT BALANCE and EVEN BUNCH

with this

12-Spindle Horizontal Buncher



Like all H-D equipment, this machine reflects more than 80 years of "know-how" combined with the most advanced technological developments. We can help you solve many of your production problems. Write our engineering department today. This may be your first step to increased efficiency.

The limits of the twisted bunched diameter are .012″ to .030″ The flyer speed is 2000 R.P.M. All flyers and spindles are ballbearing mounted.

TAKE-UP SPOOL. 5″ diameter x 4″ traverse x 2¾″ barrel. Protected capacity 10.5 lbs. Automatic adjusting tension control.

TWIST RANGE. Capstan controlled overall range 1.0″ to .10″ lay. Individual machine range 3.3 to 1 ratio of above. For example—.15 to .50 inch lay.

DRIVE. Motor drive with clutch pick-up for controlled starting.

FLOOR SPACE. Machine 5′ 6″ x 3′ 6″. Creel space depends on maximum number of wires being bunched.

FOOTAGE COUNTER. Can be installed to stop the machine at predetermined footage requirements.

POSSIBLE USES. The machines are being successfully operated on Litz Wires that fall within the range of the machine, Fourdrinier Wire and many specialties where a precision bunch is required.

HASKELL-DAWES MACHINE COMPANY, INC.

Wire Bunchers, Wire Stranders, Special Twisters, Tubing Twisters, Cordage Formers and Layers.

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PHILADELPHIA 34, PA.
Cable Address "DAWCO" Philadelphia

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PRECISELY GRADED

DIAMOND POWDER

SERVING INDUSTRY'S

SPECIALIZED NEEDS

I.D.A. MEMBER INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, INC.

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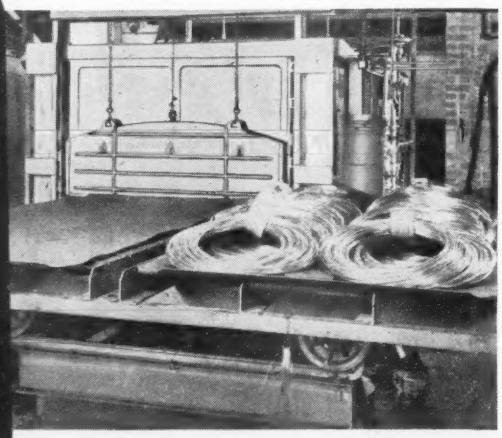
ROCKWELL FURNACES

for Annealing Hardening · Drawing · Normalizing Galvanizing and Tinning

Batch or Continuous · Oil, Gas or Electric

Direct Heated Muffle Type Radiant Tube Atmospheres



Gas-fired pan type furnace for annealing 5000 lbs. of medium gauge brass wire; furnace atmosphere controlled to produce oxide-free wire — in many cases practically bright. Other Rockwell furnace types include parallel tube, belt conveyor, pit, hood and others.

ROCKWELL ALSO BUILDS *Coil winding machines, reels and spools; pickling, brushing, cleaning, washing, finishing, drying and handling equipment; ovens and dryers; special fabrications; nonferrous rod mills.*

ROCKWELL SINCE 1888 BUILT

FURNACES · OVENS · SPECIAL MACHINERY

W. S. ROCKWELL COMPANY

242 ELIOT STREET • FAIRFIELD, CONN.

In Canada: Francis Hankin & Co., Ltd. Montreal & Toronto

Copper Coat (Also Straw and White Coat)

1. Wet drafting of fine wire sizes.
2. Dry or wet drafting of wire where specification requires this type of coat.

★ ★ ★

IN brief, sull and borax coat for heavy sizes and borax coat for light sizes is our standard practice for dry drafting except for spring wire over .054″ diameter or where specifications require another coat. These coatings have been found to give us desirable and consistent results and are capable of being controlled with ease. A lime coat is necessary on spring wire over .054″ diameter to prevent slippage of the wire in spring coiling machines. For this one application, a sull and borax coat is not satisfactory because the surface of the finished wire tends to be slippery and somewhat tacky and does not flake in forming as does a lime coat. However, for spring wire under .054″ diameter, a straight borax coat has proven satisfactory.

★ ★ ★

Chemically Applied Coatings for the Cold Drawing of Wire

(*Continued from page* 1049)

CONTINUAL research work in this field is bringing other advantages such as better pickling methods and controls to insure efficiency and uniformity on stainless alloy wire. Also, our work is showing that lubricants compatible with this coating may further increase its advantages.

★ ★ ★

Carbon Wire

DURING the last six years several attempts have been made to use existing phosphate coating processes to aid in the cold drawing of carbon wire in this country. These trials, although quite successful could not show enough advantage cost-wise to justify the conversion of present pickle house facilities. Consequently, during this period the phosphate coating while used extensively on carbon tubing has had only limited application on wire and rod. For the most part use on these items has

been limited to difficult applications such as the drawing of shaped wire and a few severe cold heading applications.

★ ★ ★

THE first of this year, however, a long range development program was instituted in this field and with the fine cooperation of the John A. Roebling's Sons Company, considerable progress is being made in adapting the phosphate coating to this industry.

★ ★ ★

WHILE many procedures involving various coating solutions have been tried a couple of the best variations will be cited to show the possibilities of such a development.

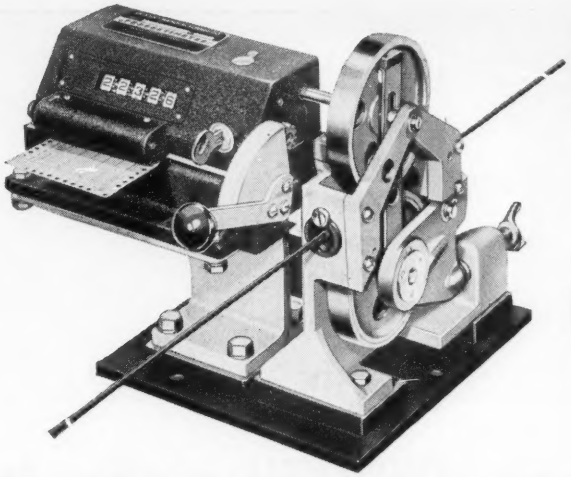
★ ★ ★

LOW carbon weaving wire was drawn to 0.0107″ on twelve reductions averaging 20% each. The equipment used was wet Vaughn Cone machines locked at a speed of 2000 ft./min. The best test run over a period of 17 days produced an average 3230# per finish die while the last half of this period gave one run of 5600# on a finish die.

★ ★ ★

THE best experimental run on 0.8 carbon tire bead wire was too short to completely wear out the dies. However, the rate of die wear indicated that an average of 25,000 pounds of wire could have been produced per finish die. This trial was on a 7-pass dry Vaughn machine drawing at 1200-1300 ft./min. with a total reduction of 86%. Improved surface is evident upon examination under metallurgical binoculars. Also where the wire is properly prepared the finished tire bead wire takes a metallic plate having a noticeably higher lustre. Graphs produced by profile measurements about the circumference of the wire show that with the phosphate coating as applied, the finish of the drawn wire after cleaning has a surface which shows only one-quarter the variation between the high and the low points when compared with wire drawn with lime or borax.

★ ★ ★



NEW "PVR" on Wire Measuring Machine

The Counter that gives you a Printed Record

RESULTS PROVE . . . . .

- INCREASED PRODUCTION — no time wasted by operators in writing figures.
- COST SAVINGS — true measurement is always recorded.
- ELIMINATION OF COSTLY MISTAKES — printed figures cannot be misread.

Send for Bulletin PVR

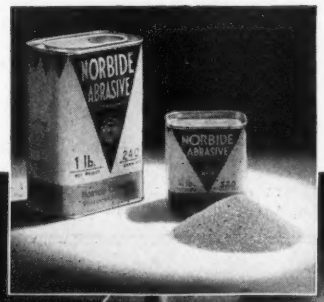
DURANT MFG. COMPANY
1918 N. Buffum St. 118 Orange St.
Milwaukee 1, Wis. Providence 3, R. I.
Representatives in Principal Cities

The quick lever reset on this new "PVR" Productimeter enables operators to produce more per day. Savings over a short time more than justify installation costs. Investigate NOW.

Durant Sales Engineers will be glad to demonstrate.

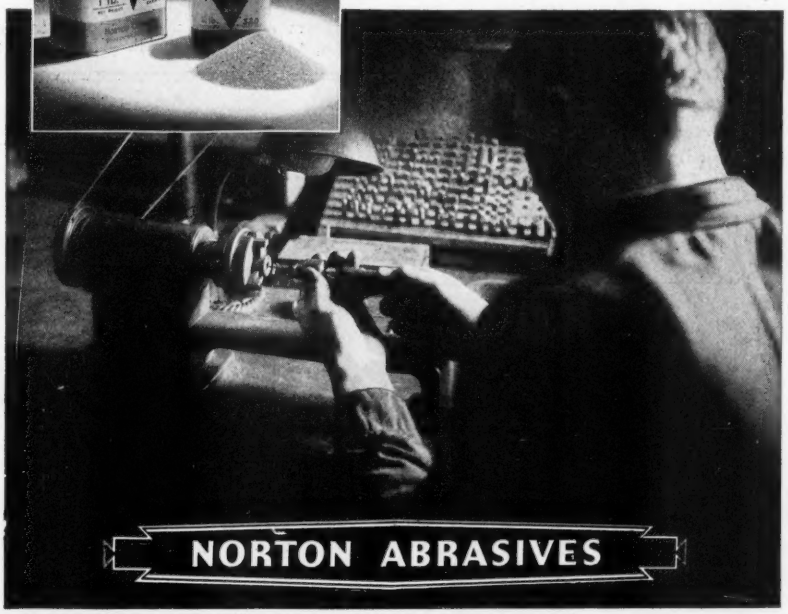
PRODUCTIMETERS
SINCE 1879 Speedometers OF INDUSTRY

NORBIDE Abrasive: Effective Economical



This abrasive—second only to the diamond in hardness and 150 times less expensive—does an efficient job of cutting and semi-finishing cemented carbide wire drawing dies.

NORTON CO. — Worcester 6, Mass.



If it's twisted folded pressed crushed shaped braided woven paper

TWITCHELL makes it

treated braiding and wrapping yarns

treated wire-rope cores

slit kraft or jumbo rolls for crushing and wrapping operations.

treated fillers for 2- and 3-wire non-metallic sheathed cable, varnished cambric, shipboard, parkway, and other power cables.

E. W. TWITCHELL INC.

Third & Somerset Streets, Philadelphia 33, Pa.

AT the present stage of experimental work, application of the process consists of the following steps:

1. **Pickling—with either sulphuric or hydrochloric acid.**
2. **Water rinse — room temperature, overflowing, (on fine wire applications this rinse is best followed by a rinse solution which neutralizes all traces of pickling salts thus producing more uniform coating conditions).**
3. **Immersion in Bonderite for 1½-3 minutes at 155°F. Reaction with the surface metal produces a zinc phosphate coating which is integral with the metal surface and serves as a separating medium. Because of its blotter-like surface the coating picks up lubricant and carries it through the dies.**
4. **Cold water rinse—to remove residual acid.**
5. **Immersion in a sealer solution one minute at 160-180°F. This gives the coatings greater resistance to corrosion and assists in drying the wire. The wire is then ready for immediate drawing on wet or dry machines or it may be force dried for a few minutes, before being stored for drawing at some future date.**

THE advantages which show promise, and should outweigh the higher chemical cost of phosphate coating, have been verified in a recent 5-week stay in Germany. Our German licensee in that country has been very successful with wire application, and in the last couple of years has demonstrated its economy and installed the Bonderite process in 20 wire mills. In wire mills where modern equipment was available, results in speeds and die life equal to our best experimental tests were being obtained in regular practice.

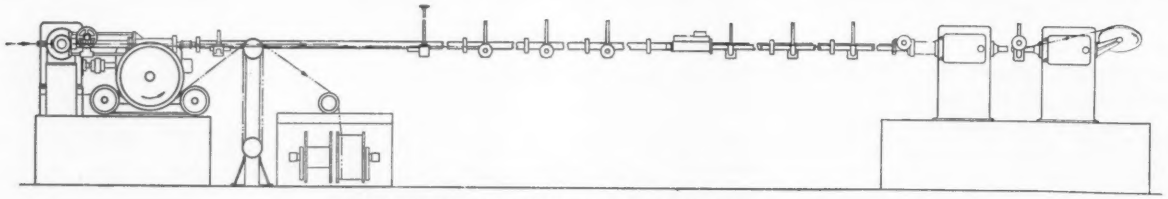
★ ★ ★

IT is expected that the Bonderite coating procedures as they are being developed will show the following advantages:

Increased die life.
Higher drawing speeds.
Improved surface finish.
Improved corrosion resistance in storage before and after drawing.
Improved physicals.

★ ★ ★

AS has been indicated, a great deal of research and field development has gone into these projects. It is our feeling that in the coming year people of the wire industry, who have worked with chemically applied coatings, will be pleasantly surprised by the advancements in this field.



DAVIS-STANDARD CONTINUOUS VULCANIZING EQUIPMENT

COMPLETE CONTINUOUS-VULCANIZING UNITS

THE STANDARD MACHINERY COMPANY, MYSTIC, CONN., U.S.A.

Established in 1848 *Incorporated in 1875*

Export Office: Drexel Bldg., Philadelphia 6.
Canada: Williams & Wilson, Ltd., Montreal, Toronto.
Chicago: Grant Engineering Co.,
Pacific Coast: W. H. Del Mar Co., 5140 Crenshaw Blvd., Los Angeles.

Molten Salt Descaling

(*Continued from page* 1051)

bath remained about constant despite the build-up of varying amounts of impurities such as carbonates and chromates. In a period of 6 to 10 weeks the total impurities tended to build up to a maximum of about 20 to 25 percent and thereafter an equilibrium apparently was reached in which the drag-out of impurities equalled the evolution in the bath. The concentration of oxidizing agents remained remarkably constant throughout the whole series of tests.

★ ★ ★

IN the meantime, a parallel investigation of other factors affecting pickling revealed that at least some of our difficulties could be traced to annealing furnace atmospheres and insufficient control of acid concentrations. As a result of the control of these factors and possibly due to the change in composition of the salt mentioned above, the periodic sluggishness experienced in our Pickle House disappeared. Accordingly, the tests were discontinued. It is now our practice only to add make-up salt to replace drag-out. Even when we pump out the pot, we do not replace the salt with fresh material, but re-use everything except that which is very high in sludge.

★ ★ ★

WE have from time to time experimented with using the treated scale resulting from the descaling operation as an aid in wire drawing. It is our opinion that it has possibilities although we have never been wholly successful in using it. A heavy hot mill or annealing furnace scale, when treated by immersion in the molten salt seems to become somewhat porous and "dusty." It has some anti-weld characteristics and when circumstances are right, tends to draw soap into the die and aid lubrication. A major problem seems to be the complete removal of free caustic from the rod before drawing. If this is not done, the coating seems to have an abrasive action causing dies to pull up very

REELS SPOOLS

ALL SIZES

WOOD- PLYWOOD -WOOD-METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

DURKEE MFG. CO. **PINE RIVER, MINN.**

MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes

In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned Coppered Steel Spring—Galvanized—Tinned Monel—Nickel Silver—Pure Soft Nickel—Oil tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper—Picture Wire—Iron Wire, Pure—Resistance Wire, Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000 in an Envelope—Florist Wire—Spooled and Coiled, 1/4-1/2-1-5#

Wires Straightened and Cut to length—Small Gauges—Small orders our specialty Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless. Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY

2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

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Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

Buy MONTGOMERY Tinsel Wires

TINSEL CONDUCTORS • RESISTANCE TINSEL
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Bare electrical conductors and resistance elements wound on reels ready for insulating with plastic, rubber, etc. Available for prompt deliveries.

Lame and thread furnished in large packages for economical and efficient production on high-speed looms.

Send for samples and engineering data.

THE MONTGOMERY COMPANY

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Cortland BRAND WIRE
pays off in performance

You boost production — help banish rejects and stoppages — when you choose Cortland Brand low carbon wires. No matter what size, finish or type you require, you'll find a Cortland Brand Wire that fits the job.

Available in all sizes . . . coils, spools, or straightened cut to length; all finishes . . . plain, galvanized, coppered or tinned; and all types . . . stone wire, bookbinder, flat wire and others. Made from best corrosion-resisting, open-hearth steel. For performance that pays off, specify Cortland Brand Wire.

WB

Cortland Brand WICKWIRE BROTHERS, INC. CORTLAND, N. Y.

WE BUY WE SELL

We Pay Highest Prices for Used Machinery

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AMERICAN MACHINERY CO.

TAKE-UP STANDS

All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

Warner

BELL-MINE

LIME

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WIRE DRAWING

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and

REELS

IT'S EXCLUSIVE!

The Reel with the
"PRESSURE PAD FASTENER"*

Most important development in many years of reel construction.

Maintenance Costs reduced.

Reels can make more trips before tightening of bolts is needed. Only one tool required; no wrench or fixture needed to hold head of bolt.

"PRESSURE PAD FASTENERS" Seal bolt holes; keep moisture out.

Get data today

* Patent applied for

HOWSAM SPOOL COMPANY
500 RATHBONE AVE AURORA ILLINOIS

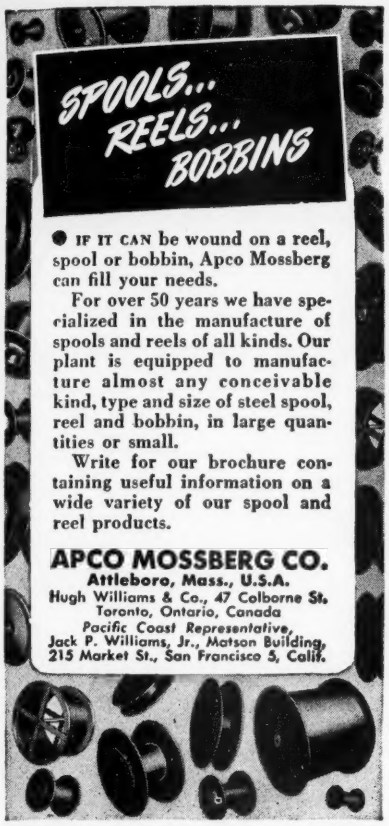
rapidly. Our best results were obtained by giving the rod a quick dip in hot muriatic acid after the descale and quench to completely neutralize the caustic. This was followed by a lime coat and baking process. We have by this method been able to obtain coatings that would draw 4 heavy drafts, but, I regret to say, not consistently. More work along these lines will, I believe, be well justified.

★ ★ ★

AS to the chemistry of the process and the theory behind it, I am afraid I cannot speak authoritatively. The Hooker Electrochemical Company says that the Virgo salt is a mixture of alkali metal hydroxide, oxidizing agents, and certain catalysts. In general the bath acts on the scale in two ways, chemically and physically. The oxidizing agents react with various components of the scale to form in the most part higher oxides of the metals. Some of the components then actually dissolve out in the fused alkali of the bath. Other components change volume due to this oxidation, thus tending to add to the porosity of the scale already achieved by the removal of the soluble components. The immersion of this hot porous scale in quench water then results in the violent evolution of steam not only on the surface but under the scale as well. This results in a substantial quantity being blown off in the quench. The remainder of the oxides, having become more reactive to muriatic or sulphuric acid, are then quickly removed in the pickling operation.

★ ★ ★

THE loss of oxygen in the bath is made up by atmospheric oxygen at the surface of the bath. This regenerative action is accelerated by the presence of the catalyst above mentioned. There are cases, I understand, in which it was found desirable to blow air into the bath to help out this action, but it has never been necessary in our installation. Sodium Chromate has a tendency to build up in the bath and is thought to have an inhibiting action. As indicated by our pickling tests mentioned above, the percentage of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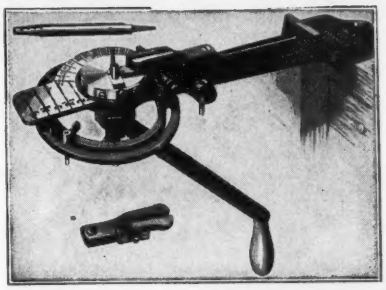
chromate builds up rather rapidly and reaches a maximum point where it apparently levels off. Presumably, this is because the drag-out carries off enough chromate to balance the evolution of chromate in the bath. The maximum percentage of chromate reached by our bath has no apparent effect on the pickling characteristics of our test pieces, so that this is not a problem in our case.

★ ★ ★

I AM informed that molten salt descaling is now used almost universally in the stainless and alloy steel mills and is finding its way into many carbon steel plants as well. It is stated that its use reduces cost and metal loss and gives a better product. I have recently seen its application in a continuous strip pickling line in conjunction with an open fire strand annealing operation on stainless steel. This particular line yielded a product so bright and smooth that I was at first under the im-

KILMER WIRE FORMER



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pression that it was a bright annealing furnace.

★ ★ ★

THERE are several other interesting applications for molten salt baths. They are being used for desanding and descaling castings. It is said that very large intricate castings may be descaled and desanded in a fraction of the time and at a fraction of the cost of methods previously employed. In other cases, castings and forgings are stress relieved as well as descaled in the molten salt bath. Our own bath has been used frequently to immerse quantities of small cupped and stamped parts which have been sealed to glass for use in vacuum tubes. The glass is very quickly dissolved in the molten salt and the parts require only a light pickle to enable their reuse.

★ ★ ★

THE usual hazards associated with any molten salt are present around the descaler. It is recommended that the operator wear protective clothes while

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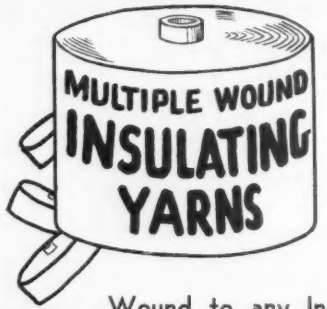

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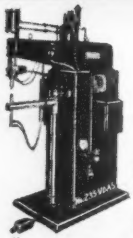

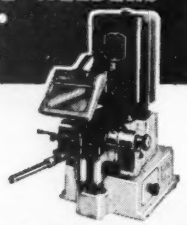

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working around the furnace and quench tank. Our man wears a long flame-proofed cotton duck coat, a leather babitting helmet and asbestos gloves while loading or unloading the pot. If a cab operated crane is used, a glass protective shield between the operator and the pot will be sufficient. A light spray blanket on top of the quench is used in some installations to effectively condense the steam which may carry some caustic particles into the air. An adequate exhaust system should also be provided for the quench. We feel that it is worth while to keep an insulated cover on the pot except while loading or unloading. This reduces heat loss from the pot and prevents stray water splash from reaching the molten salt.

* * *

MOLTEN salt descaling is now an accepted tool for many industries. Like many new tools, it has caused its share of headaches. It is now tamed; most of the difficulties and shortcomings have been overcome. In our plant it is an essential and efficient part of our manufacturing process whose presence we are now likely to forget until some visitor asks, "Say, how do you get the scale off that_____stainless". Or until as in many cases, someone says, "Say, Clark, we'd like you to give a paper at the next Wire Association Convention."

* * *

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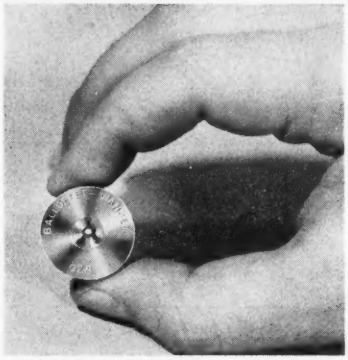

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Polyvinyl Chloride As An Electrical Insulating Material

(*Continued from page* 1044)

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CREDIT and thanks are extended to the technical service staffs of **The Bakelite Division, Union Carbide and Carbon Corporation,** and the **Plastics Division, Monsanto Chemical Company,** for their proofreading and checking of technical data.

★ ★ ★

New Wire Weaving Loom Folder

FITZ WATER WHEEL COMPANY, Hanover, Pa., has just published a new folder describing its line of fly screen and hardware cloth looms, together with accessory equipment required in the manufacture of woven wire cloth, such as spool winding, bobbin winding, cloth wrapping, warp drum machines, etc.

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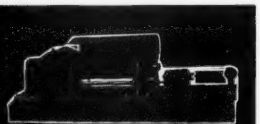
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A New Method of Storing Rod

(*Continued from page 1055*)

AFTER the mechanism has been expanded, the hook can be raised, tilted or turned to the vertical position and the coils will not slide off. In transporting a load, the load can be in the horizontal position until the stack space is reached, when it is tilted to the vertical and lowered into the stack space, the mechanism is retracted and the empty hook is raised.

★ ★ ★

WHEN reclaiming rod from storage the hook is lowered into the stack vertically, with mechanism retracted, and when the main body piece rests on the stack the mechanism is expanded, the hook raised and the load can be transported vertically or horizontally.

★ ★ ★

SINCE most wire mills purchase rod with three ties, no extra ties are necessary. Where a rod mill consumes its rod output for its own wire products, ties should also be provided, and this is desirable to prevent snarling at other operations. It has been noted when this is not done, the saving by eliminating ties is lost in untangling turns in coils at the cleaning line or draw block.

★ ★ ★

THE vertical hook can also be used for horizontal storage in areas where for some reason special temporary horizontal storage is necessary. It is also safer insofar as transportation of a unit load is concerned, since the coils are held on the hook by the expanded mechanism. Coils cannot slip off as they might on the conventional horizontal type of hook on which they are merely hung or suspended.

★ ★ ★

THE slides which followed illustrated some details of hook construction, binning arrangement and several types of installations.

★ ★ ★

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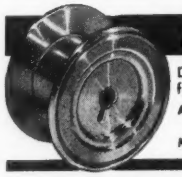

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Bridge Mfg. Co., Inc. 1065
Bronze Die Casting Co. 1090

C

Carboloy Company, Inc. 1028
Carl-Mayer Corp., The 1090
Ceilcote Company, The 1090
Chemsteel Construction Co. 1090
Clark, J. L. Mfg. Co. 1071
Cleveland Tramrail Division of the
Cleveland Crane & Engineering Co. 1030
Cochaud Wire Die Corporation 1089
Columbia Steel Company ..... 1056 & 1057
Continental Steel Corporation 1016

D

Danforth, C. W., Co., The 1091
Davis, R. L., Electric Co., Inc., The 1019
Diamond Distributors Inc. 1082
Drying Systems, Inc. 1091
Durant Mfg. Co. 1083
Durkee Mfg. Co. 1085

E

Eastern Carbide Corp. 1032
Eisler Engineering Co., Inc. 1088
Electric Furnace Company ..... Back Cover
Emory, Robert J., Company 1077
Engis Equipment Co. 1073
Entwistle, James L., Co. ..... 1040 & 1067

F

Fatigue of Materials Laboratory 1092
Fidelity Machine Co., Inc. 1088
Firth Sterling Steel & Carbide Corp. 1020
Fort Wayne Wire Die, Inc. 1089

G

Glader, Wm., Machine Works 1066
Glass Fibers, Inc. 1018

H

Hartley Tool & Die Company 1017
Haskell-Dawes Machine Co., Inc. 1081
Haveg Corporation 1090
Holden, A. F., Co. ..... 1060 & 1061
Hoosier Wire Die, Inc. 1089
Houghton, E. F. & Co. 1090
Howsam Spool Company 1086
Hubbard Spool Company 1090
Hughesville Machine & Tool Company 1070

I

Indiana Wire Die Company 1089
Industrial Ovens, Inc. 1090

J

Johnson Steel & Wire Co. 1064

K

Kagan-Dixon Industries, Inc. 1090
Kelly Wire Die Corporation 1089
Keystone Steel & Wire Company 1063
Kilmer, M. D. & Co. 1087

L

Lancaster, Allwine & Rommel 1092
Lewis, K. B. 1092
Lewis Machine Company, The 1076
Lundahl Corporation 1090

M

Magnus Chemical Co., The 1013
Malin & Company, The 1085
Marshall-Richards Machine Co., Inc. 1023
Mason Can Company 1088
Metal Carbides Corporation 1024
Metal & Thermit Corporation 1081
Mettler Machine Tool, Inc. 1074
Michigan Oven Co. 1091
Micro Products Company 1062
Miller, R. H. Co., Inc. 1021
Montgomery Company, The 1085
Morgan Construction Company ..... Front Cover
Mossberg Pressed Steel Corp. 1077

N

National Machinery Exchange 1091
National Research Co. 1087
National Waterproof Papers, Inc., Crepe-Kraft 1090
New England Butt Company 1091
New England Lacquer Co. 1080
New England Wire Die Co. 1089
Niles Steel Products Div., Republic Steel Corp. 1039
North American Philips Co. 1079
North Anson Reel Company 1091
Norton Company, The ..... 1022 & 1083

O

Oakite Products, Inc. 1087
Owens-Cornings Fiberglas Corp. 1026

P

Pacific Coast Borax Company 1087
Parkin Chemical Co., The 1091
Percelay Yarn & Textile Co. 1088
Pirelli-General Cable Corp. 1034
Pittsburgh Cut Wire Company 1068
Platt Brothers & Co., The 1091
Potter, Neil C. 1090

R

Rockwell, W. S. Co. 1082
Roebling's John A., Sons Company 1015
Roos, Tool & Mfg. Company 1080
Ross, J. O., Engineering Corp. 1091
Royle, John & Sons 1072
Ruesch, H. J., Machine Co. 1090
Rusch Wire Die Corporation 1089

S

Scott Testers, Inc. 1091
Scudder, E. J., Foundry & Machine Co. 1091
Sjogren Tool and Machine Co., Inc. 1085
Sleeper & Hartley, Inc. 1091
Standard Industrial Compounds Co. 1025
Standard Machinery Co., The 1084
Steel Equipment Co. 1068
Surface Combustion Corp. 1090
Swift & Company 1033
Syncro Machine Company 1027

T

Tennessee Coal, Iron & R. R. Co. ..... 1056 & 1057
Terkelsen Machine Company 1091
Torrington Manufacturing Co. 1091
Trauwood Engineering Co., The 1091
Twitchell, E. W., Inc. 1084

U

U. S. Steel Export Company ..... 1056 & 1057

V

Vascoloy-Ramet Corporation 1036
Vaughn Machinery Company 1029

W

Walde, Leonard O. 1092
Warner Company 1086
Waterbury Farrel Foundry & Machine Co. 1038
Watson Machine Company ..... Inside Back Cover
Wayne Wire Die Co. 1089
Wean Equipment Corporation 1045
Wells, Frank L. Co. 1070
Wickwire Brothers, Inc. 1086
Wilson, Lee, Engineering Co., Inc. ..... Inside Front Cover
Wire & Textile Machinery, Inc. 1086

Y

Youngstown Sheet & Tube Company, The 1035
Youngstown Welding & Eng'g Corp. 1031

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyer's Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT—
American Insulating Machy. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy., Inc., Pawtucket, R. I.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Morgan Construction Co., Worcester, Mass.
Ross, J. O., Engr. Corp., New York, N. Y.

BAR STOCK—Stainless Steel
American Steel & Wire Company, Cleveland, Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
U. S. Steel Export Company, New York, N. Y.

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

BORAX—Wire Drawing
Pacific Coast Borax Corp., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Pawtucket, R. I.

CABLE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.

CABLE LACQUERING OVENS—
Industrial Ovens, Inc., Cleveland, O.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Mach. Co., Trenton, N.J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
(See Cleaners—Metal)

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Houghton, E. F., & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Metal & Thermit Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
The Parkin Chemical Company, Pittsburgh, Pa.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corp., Newark, Del.
Holden, A. F., Company, The, New Haven, Conn. and Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

CLOTH—WIRE, All Metals
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J. Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

COLD HEADERS—
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond
Eastern Carbide Corp., New Rochelle, N. Y.
Hyprez Division, Engis Equipment Co., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Shell Oil Company, New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Potter, Neil C., Newark, N. J.
Shell Oil Company, New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CORROSION PREVENTIVES—
Angier Corporation, The, Framingham, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, New York.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Diamond Distributors, Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, C. W., Co., Youngstown, Ohio.
Diamond Distributors, Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Hyprez Division, Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING
National Research Company, St. Claire Shores, Mich.

DIAMOND TOOLS—
Carboloy Co., Inc., Detroit, Mich.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide
(See Dies—Tungsten Carbide)

DIES—Cold Heading
American Carbide Die Company, Union City, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co. Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
American Carbide Die Company, Union City, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp. New Rochelle, N. Y.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Metal Carbides Corporation, Youngstown, Ohio.
Murex, Ltd., Rainham, England
Robertson, John, Co., Brooklyn, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
American Carbide Die Company, Union City, N. J.
Eastern Carbide Corp. New Rochelle, N. Y.
Hartley Tool & Die Co., Thomaston, Conn.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
American Carbide Die Company, Union City, N. J.
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., New York, N. Y.
Carboloy Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp. New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hartley Tool & Die Co., Thomaston, Conn.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N. Y
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Sintered Carbide
Hoosier Wire Die, Inc., Ft. Wayne, Ind.

DIES—Special Shapes, Etc.
American Carbide Die Company, Union City, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.

WHERE TO BUY, Continued

Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

DIES—Swaging
Murex, Ltd., Rainham, England
Sjogren Tool & Machine Co., Inc., Auburn, Mass.

DIES—Tantalum Carbide
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp. New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIES—Tube Drawing
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIES—Tungsten Carbide
American Carbide Die Company, Union City, N. J.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Hartley Tool & Die Co., Thomaston, Conn.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS—Flange Steel
Hubbard Spool Company, Chicago, Ill.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., The, Paterson, N. J.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Rockwell, W. S., Co., Fairfield, Conn.
Ross, J. O., Engineering Corp., New York, N. Y.

ENGINEERS—Consulting
Copper—Leonard D. Walde, Seekonk, Mass.
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Mill—Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Davis, R. L., Elec. Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Company, The, Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio,

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Holden, A. F., Co., The, New Haven, Conn. and Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Rockwell, W. S., Co., Fairfield, Conn.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Rockwell, W. S., Co., Fairfield, Conn.
Trauwood Engineering Co., The, Cleveland, Ohio.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, New Haven, Conn. and Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Holden, A. F., Co., The, New Haven, Conn, and Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Robertson, John, Co., Brooklyn, N. Y.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, New Haven, Conn, and Detroit, Mich.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Holden, A. F., Co., The, New Haven, Conn, and Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, New Haven, Conn, and Detroit, Mich.

FURNACES—Resistance Heating, Strand
Trauwood Engineering Co., The, Cleveland, Ohio.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, New Haven, Conn, and Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Harper Electric Furnace Corp., Niagara Falls, N. Y.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING EQUIPMENT—
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Bronze Die Casting Co., Pittsburgh, Pa.
Lewis Welding & Eng'g Corp., Bedford, Ohio.
Youngstown Welding & Engineering Co., Youngstown, Ohio.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin Chemical Company, The, Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
American Insulating Machine Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
Belding, Heminway, Corticelli Co., New York, N. Y.
Du Pont de Nemours, E. J., Co., Wilmington, Del.
Glass Fibers, Inc., Waterville, Ohio.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Owens Corning Fiberglas Corp., Toledo, O.
Standard Varnish Works, Staten Island, N. Y.
Twitchell, E. W., Philadelphia, Pa.

INSULATING MATERIALS—Paper — For Electric Wire Cable.
Merrimac Paper Co., New York, N. Y.
Twitchell, E. W., Philadelphia, Pa.

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Standard Varnish Works, Staten Island, N. Y.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Roos, Tool & Mfg. Co., Montclair, N. J.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Haveg Corp., Newark, Del.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Houghton, E. F. & Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Shell Oil Company, New York, N. Y.
Standard Industrial Compounds Co., Inc., Chicago, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, for lagging and car blocking
North Anson Reel Co., North Anson, Maine.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio.

MACHINERY—Bead Wrapping
Terkelsen Machine Co., Boston, Mass.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

WHERE TO BUY, Continued

Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Eisler Engineering Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H. Machine Co., The, Bridgeport, Conn.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coilers
Boyd & Sons Manufacturing Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (used), New York, N. Y.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

MACHINERY—Cold Heading
(See Cold Headers)

MACHINERY—Copper Wire Drawing and Rolling
Aetna-Standard Engineering Co., Youngstown, Ohio.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J. Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila., Pa.
National Rubber Machinery Co., Akron, Ohio.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Mettler Machine Tool, Inc., New Haven, Conn.
National Mach'y Exch. (Used) New York, N. Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kagan-Dixon Industries, Inc.
Kelly Wire Die Corp., New York, N. Y.
Roos, Tool & Mfg. Co., Montclair, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Aetna-Standard Engineering Co., Youngstown, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
National Rubber Machinery Co., Akron, Ohio.
Pirelli-General Cable Corp., Southampton, England
Robertson, John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co,, Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Galvanizing
(See Galvanizing Equipment)

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
National Rubber Machinery Co., Akron, Ohio.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Pirelli-General Cable Corp., Southampton, England
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Material Handling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Engineering Co., Youngstown, Ohio.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Youngstown, Ohio.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J
Torrington Mfg. Co., Torrington, Conn
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio.
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, Ohio.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Kagan Dixon Industries, Inc., Rahway, N. J.
Ruesch, H. J. Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Boyd & Sons Manufacturing Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
National Mach'y Exch. (Used), New York, N.Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
Lundahl Corp., Hartford, Conn.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., The, Cleveland, Ohio.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N.Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Aetna-Standard Engineering Co., Youngstown, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

WHERE TO BUY, Continued

MACHINERY—Swaging
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Testing Physical
Lundahl Corporation, Hartford, Conn.
Scott Testers, Inc., Providence, R. I.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L. Elec. Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Co., Cleveland, Ohio.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Marshall-Richards Machine Company, Inc., Trenton, N. J.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply, Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Aetna-Standard Engineering Co., Youngstown, Ohio.
Davis, R. L. Electric Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio.
Marshall-Richards Machine Company, Inc., Trenton, N. J.
National Rubber Mach'y Co., Akron, Ohio.
Standard Machinery Co., Mystic, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio.

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Youngstown, Ohio.
American Insulating Mach'y Co., Phila., Pa.
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Forming
Kilmer, M. D. & Co., Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N.Y
Nilson Machine Co., A. H., Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N.Y.

MACHINERY—Wrapping Straight Lengths and Tubing
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

MACHINERY—Wrapping Wire Coils
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio.

NAILS—Wire
American Steel & Wire Co., Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.

OVENS—Dehydrogenizing
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Ross, J. O., Engr. Corp., New York, N. Y.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Ross, J. O. Eng'g Corp., N. Y., N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Drying Systems, Inc., Chicago, Ill.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio.

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D.C.

PHOSPHATE COATING CHEMICALS
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Bronze Die Casting Co., Pittsburgh, Pa.
Lewis Welding & Eng'g Corp., Bedford, Ohio.
Youngstown Welding & Engineering Co., Youngstown, Ohio.

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

PNEUMATIC CYLINDERS—
Entwistle, James L. Co., Pawtucket, R. I.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio.

POTS—Lead Melting
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Mystic, Conn.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N.J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REEL AND TENSION STANDS—
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Roll-a-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Roll-a-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Drawn Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Chicago, Ill.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio.

REELS & SPOOLS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS & SPOOLS—Plastic
Hubbard Spool Co., Chicago, Ill.

REELS & SPOOLS—Steel
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mason Can Company, Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Clark, J. L., Mfg., Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
Mason Can Company, Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
North Anson Reel Co., North Anson, Maine.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Nelson Co., The, Baltimore, Md.
North Anson Reel Co., North Anson, Maine.

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Chicago, Ill.
North Anson Reel Co., North Anson, Maine.

REELS—Takeoff
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
North Anson Reel Co., North Anson, Maine.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.

WHERE TO BUY, Continued

Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Company, Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg., Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mason Can Company, Providence, R. I.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
North Anson Reel Co., North Anson, Maine.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

RESISTANCE HEATING—Annealing Patenting, Etc.
Trauwood Engr. Co., Cleveland, Ohio.

ROD BAKERS—
(See Ovens—Rod Bakers)

RODS—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Sales, Inc., Oakland, California.

RODS—Nickel Alloy
International Nickel Co., Inc., New York, N.Y.

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Roebling's John A., Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York. N. Y.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Company, The, New Haven, Conn. and Detroit, Mich.
Houghton, E. F. & Co., Philadelphia, Pa.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc., Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANKS—Compound
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Company, Cleveland, Ohio.
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

TANKS—Steel
Chemsteel Construction Co., Pittsburgh, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TINSEL—Cords, Decorative
(See: Tinsel—Electric Conductor)

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL—Electric Resistance
(See: Tinsel—Electric Conductor)

TINSEL—Lame, Silver and False Gold
(See: Tinsel—Electric Conductor)

TINSEL—Thread, Silver and False Gold
(See: Tinsel—Electric Conductor)

TINSEL—Thread, Decorative
(See: Tinsel—Electric Conductor)

TINSEL—Wire
(See: Tinsel—Electric Conductor)

TOOLS—Spring Forming
Lundahl Corporation, Hartford, Conn.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

TRAVERSE MECHANISMS—
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Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc., Pawtucket, R. I.

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Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
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Micro Products Co., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
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Davis R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.
Elmet Division, North American Philips Company, Inc., Lewistown, Maine.
Kaiser Aluminum & Chemical Sales, Inc., Oakland, California.
Malin & Co., Cleveland, Ohio.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Electric
Malin & Co., Cleveland, Ohio.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewistown, Maine.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland-Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.
Webb Wire Works, The, New Brunswick, N. J.
U. S. Steel Export Co., New York, N. Y.

WIRE—Needle
Webb Wire Works, The, New Brunswick, N. J.

WIRE—Nickel & Nickel Alloy
International Nickel Co., Inc., New York, N. Y.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specifications for Special Purposes
North American Philips Co., Inc., New York, N. Y.

WIRE—Spring
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
U. S. Steel Export Co., New York, N. Y.
Webb Wire Works, The, New Brunswick, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland-Chicago, New York.
Columbia Steel Co., San Francisco, Calif.
Firth Sterling Steel & Carbide Co., McKeesport, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Webb Wire Works, The, New Brunswick, N. J.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.

WRAPPING PAPER—Creped
Angier Corporation, The, Framingham, Mass.
Crepe-Kraft Company, The, Division National Waterproof Papers, Inc., Newark, N. J.

YARNS & TAPES—
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Du Pont de Nemours, E. I., Co., Wilmington, Del.
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Owens Corning Fiberglas Corp., Toledo, Ohio.
Percelay Yarn & Textile Co., Pawtucket, R. I.
Twitchell, E. W., Philadelphia, Pa.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

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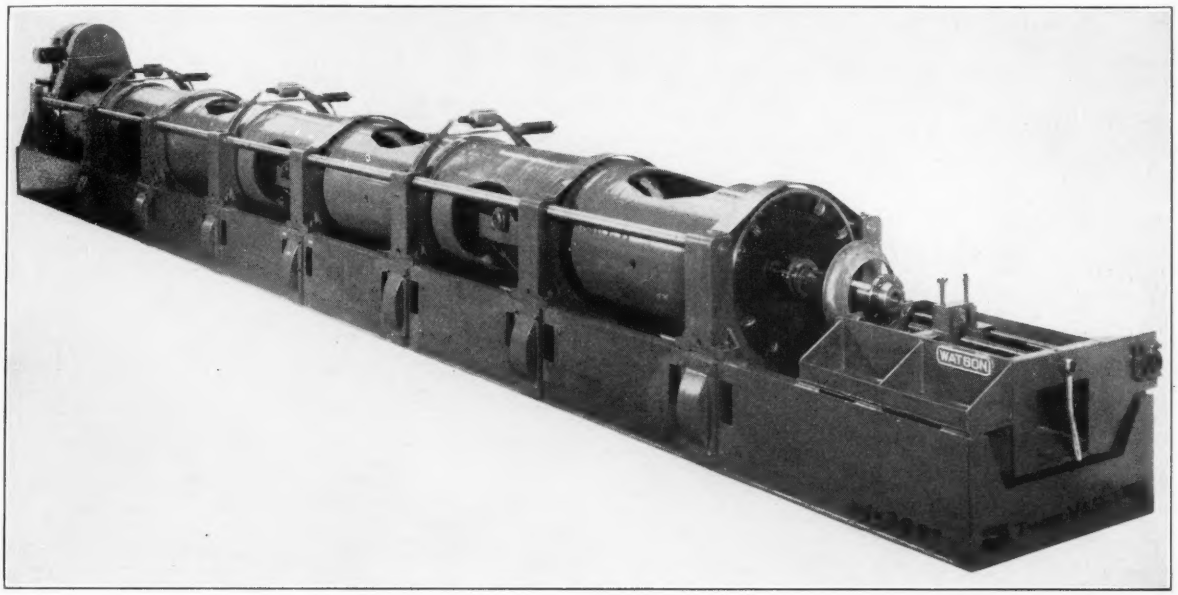

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* * *

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* * *

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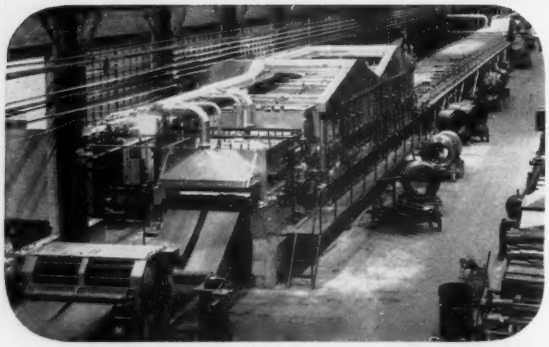
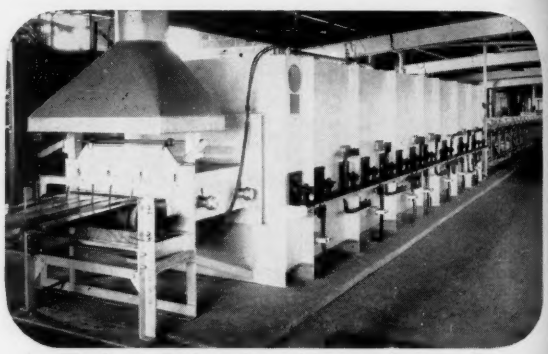


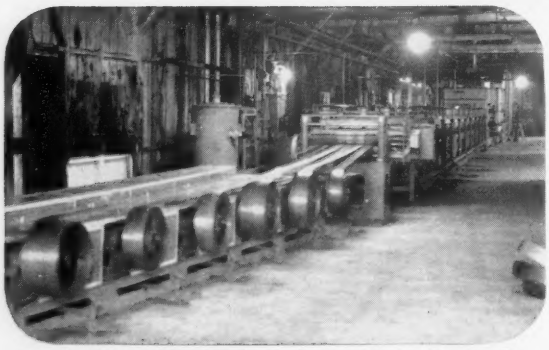
Steel strip in single or multiple strands up to a total width of 54" may be bright annealed or normalized, continuously, in this EF gas fired radiant tube installation. Capacity 7200 lbs. per hour.



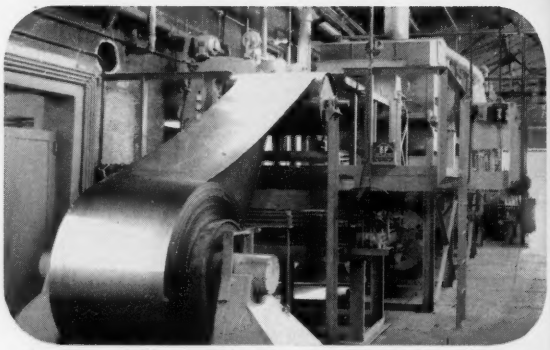
An EF electrically heated special atmosphere installation bright annealing six parallel strands of cold rolled steel strip, continuously. Handles single and multiple strands up to a total width of 30".

SOME TYPICAL EF INSTALLATIONS

For Processing Strip



Another EF gas fired radiant tube, continuous furnace for bright annealing or normalizing cold rolled strip steel. Has preheater or burn-off chamber and handles 2000 lbs. strip per hour.

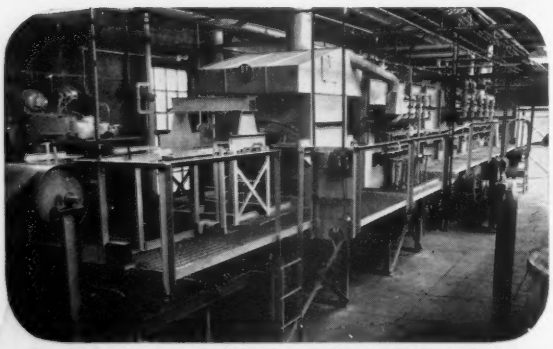


An EF special atmosphere furnace with flame preheating burn-off or oxidizing section, and controlled heating and cooling zones for producing various surface conditions on strip steel.

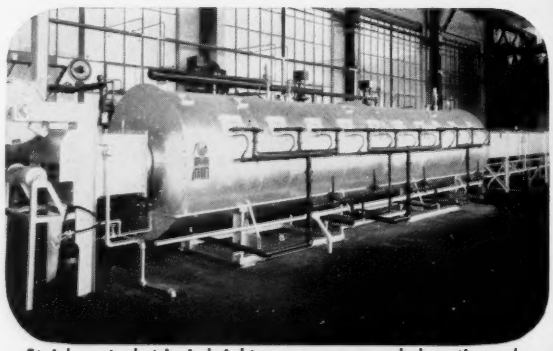
Designed and Built by

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces—For Any Process Product or Production



This EF combination fuel fired and electrically heated strip processing unit provides extreme flexibility in heating, soaking and controlled cooling cycles for treating various grades of strip.



Stainless steel strip is bright or process annealed continuously in this EF gas fired special atmosphere tube muffle type furnace. It also handles other strip requiring lower temperatures.